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--OF--  
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DENTAL SCIENCE,

—EDITED BY—

F. J. S. GORGAS, M. D., D. D. S.

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necticut Valley Dental Associations at Worcester, Mass. What I shall endeavor to do now is simply to elaborate the remarks of Dr. Atkinson last evening, and confirm them with some illustrations of development on the teeth of the lower animals, hoping with these to leave an impression upon your minds which will not soon be erased.

First, a word or two upon dental caries. If you ask the numerous teachers in this country to formulate an answer to the inquiry, What is dental caries? they will probably tell you it is molecular death and disintegration of the tooth tissue. We will not stop now to discuss the correctness of this answer. It is one that has been almost universally given to classes in dental schools as well as in the meetings of dental societies. Molecular disintegration we have, but that this is preceded by death is doubtful indeed, and the consideration of this one point in the pathological phenomena is well worthy of consideration by any dental society. Many theories have been advanced by thoughtful men regarding the cause of this pathological condition designated dental caries. First it was held that it was wholly due to chemical action; and there are men to-day who take the ground that that is the only cause. They claim that there is some solvent, an acid, in the mouth, which comes in contact with the tissues of the teeth, breaking up the continuity of the structure and dissolving out the lime salts or inorganic portion. Then there are others who take the other extreme, and assert that dental caries is the result of vital action; that through some deficiency in nutrition and other abnormal systemic conditions, there is a loss of continuity between the hard or inorganic and the soft or organic structures, and in consequence of that loss of continuity, the dissolution of the teeth naturally follows. Another theory is that the cause of decay is chemico-vital; that perverted or imperfect nutrition during the calcification of the hard tissues results in abnormality both as to quantity and quality, this being a predisposing cause of caries, the teeth then becoming an

easy prey of some solvent in the mouth, which is assumed to be an acid. We have also, within the last few years, had advanced by our friends abroad as well as at home, what is termed the parasitic theory, that decay is produced by certain low forms of vegetable or animal organisms in the mouth, some of which by their roots or mycelium burrow into the tissues of the teeth and leave them in a condition to readily break down; and that other organisms, by virtue of their contact with the oxygen of the atmosphere, eliminate an acid, and in that way we have a solvent produced which disintegrates the tooth structure. These latter theories entirely overlook the fact that many of these organisms are merely messmates, that they live in the mouth by virtue of the pabulum on which we also live, and are not parasites at all; simply living on the remains of our food, on dead and refuse material, and not interfering with the live tissues in any way. Then we have still another theory, that advanced by Dr. Bridgman in England, called the electrical theory; that is by reason of a want of correspondence in the electrical conditions of the organic and the inorganic structures that the teeth are broken down.

The fault I find with all of these theories is not that they, or most of them, have not some grain of truth in them sufficient to warrant their advancement as elements in the problem of decay; but that it is claimed by their several and special advocates that they are *the* element. In attributing dental caries to any one of these supposed causes we seem to entirely ignore the laws governing the development and nutrition of structures. When a tooth is developed it is in accordance or in correspondence with law, like other tissues. Its morphology, its structural arrangement, its density, its size, its location, all are subservient to its function and nutrition. If function is delegated to some other part or organ, nutrition is likewise diverted. Health and normality in any and every respect must be preceded by normal or natural exercises of function. The arrangement of the tissues, the size, shape

and density of the teeth are not matters of whim or accident but are due to the natural result of the mechanical forces that have been brought to bear upon them; they are the result of the degree and direction of force that has been exerted upon them by the food habit through many successive generations; they are in exact correspondence with the amount and direction of force that has been and is exercised in the preparation of the food, or in the exact ratio of the amount of resistance offered by the trituration of the food upon which the animal lives.

This brings tooth formation down to the single point of food habit, and in my estimation *tooth formation and nutrition are the result of food habit.*

In the treatment of the mouths of many children we see unmistakable evidence of this absence of function. We risk nothing in saying to the mother or guardian of many of these patients that the food is washed into the stomach with one of various liquids without mastication; and we may with safety and great propriety add that unless there is some change in the food habit of this child the success of our efforts in behalf of tooth preservation will be but limited. Fluids must be restricted at meal time. Solid food must be substituted for the semi-solid, and the eight or ten minutes usually occupied in the consumption of a meal must be extended to twenty-five or thirty minutes. I say constantly to the parents of my young patients, if you want to save this child's teeth you must banish drink from the table during meal time; let the children drink all they want before and after meals, but at meals the food should be taken as nearly dry as possible, and let the child spend half an hour or more in its mastication, utilizing the natural secretions, not washing down its food with copious draughts without an effort on the part of the teeth to triturate and prepare for the subsequent digestive process. I bring up this point here because I want to make it more clear that, in my estimation, the loss of function is one great cause of this rapid decay of the teeth. The healthy or

normal development of the teeth is exactly in proportion to the stimulus of the resistance that is offered to them in the cutting or mastication of food. Now, gentlemen, a recognition of the foregoing is what interests *us* as dentists, and on behalf of *our patrons* or *patients* for their own welfare and comfort. In continuation of my remarks I hope, with the aid of these specimens upon the table before us, to show you how these various tooth forms have been the result of jaw movements, and these movements again a necessity by virtue of the kind of food, and so, in regular succession, we can safely say, *first*, that food habit has been the important factor and controlling influence in shaping tooth forms; *second*, that the restriction and limitation of diet has contributed to specialization of the teeth; *third*, the degree in which teeth are changed or modified in form and structure is in proportion to the difference in the degree of resistance to be overcome in the mastication of food.

For the sake of perspicuity, and at the risk of being tedious, let us first define a tooth, with its location, function, etc. The definition given is that it is a hard substance projecting from the surface of the mucous membrane; it is differentiated from the surrounding structures and opposes another tooth, or a dental plate, or else in its function works against some other substance less dense. It is located in the anterior or preassimilative portion of the alimentary canal, and in the mammalia it is confined to the inferior and superior maxillæ, always working in a vertical or modified vertical direction and against other teeth or some dense substance, so as to stimulate its nutrition and health.

All teeth may be arranged into five classes. First, the simple cone-shaped tooth, which is represented in the cuspid of the carnivora, the prehensile teeth of all animals swallowing their prey whole, and a large class of fishes, as well as the poison fang of reptiles and the teeth of the sperm-whale. These are among the simplest forms of teeth found in the animal economy. The next would be a

chisel-shaped tooth, examples of which we see in the incisors of the rodents and other vertebrate animals. In the third class we place the trenchant-shaped teeth, seen in carnivorous animals, which shut over each other like the blades of a pair of scissors, and are for lacerating or tearing. Then come the teeth which we find in the monkey tribe, having little tubercles on the triturating surface for crushing. The fifth and last class are the molars, represented by those of the elephant, and of the rodents, but the most specialized or typical are those found in the herbivora, used for grinding grass and dry food. Nearly all the teeth of the animal kingdom may be placed in one of these five classes, by a little addition or subtraction, corresponding with modifications in food habit and mandibular or jaw movement. When we pick up a mandible that is armed with cone-shaped teeth we know very well that its movement is limited to a vertical or up and down motion. The teeth in it are not for the trituration of food, but for seizing it.

Corresponding with this cone-shaped tooth and the vertical motion, which is found in all carnivorous animals and which is not a mere matter of taste or accident, but of necessity, because of the class of food upon which the animal subsists, we find the shape of the condyle and the glenoid cavity to correspond, the latter hugging, or so adapted to the former as to preclude any other motion. So we see that the food habit controls not only the movements of the jaw and shape of the teeth, but the form and adaptation of the condyle and glenoid cavity. We now take the other extreme in shape, represented by the molars of the rodents and the elephant, and we find instead of the glenoid cavity a convex surface, and the condyle a flat or slightly concave surface, which slides over the convex surface of the glenoid cavity; and this arrangement permits not only a lateral motion of the jaw, but the antero-posterior, which is so essential to the rodent. But the food habit of the animal was the first factor or necessity which

produced the lateral and antero-posterior motions, and these motions gave us the tooth form, the condyle articulation of necessity following. We might follow this up through the whole anatomical structure of various animals, and find corresponding results in the digestive organs of the animal as well as in the modes of progression.

The teeth of the mammalia, and indeed nearly all of the vertebrate, are made up of three tissues; dentine, cement and enamel, the enamel germs being present in all. In a large class of animals, as in man, these tissues are arranged with the dentine in the centre, the enamel covering the dentine of the crown and the cement covering the dentine of the root. This is the common arrangement in teeth of all carnivorous and omnivorous animals; and in these animals we find the teeth less specialized than in the herbivora and rodentia, where instead of having the enamel covering the crown it is arranged in transverse lines running across the triturating surface, or the peculiar *W* shaped pattern, by a dipping in of the enamel from the sides, as is seen in many of the herbivora. Where there is an antero-posterior motion of the jaw in connection with the lateral we have these lines running transversely across the teeth, and with this the most complex structure condition. The object of this arrangement is patent to any one, the three tissues being of different degrees of density, and standing side by side, there will always be an uneven surface, with the most dense tissue prominent which is most efficient in the preparation of the dry food upon which the animal subsists, and again we recognize that this peculiar adaptation of the teeth to the necessities of the animal is the result of food habit. There is no exception to this rule; it is the force exercised upon the teeth which modifies their form and structural arrangement.

If you will bear with me a few moments I will show you how true this is throughout the animal kingdom. Taking first some illustrations from invertebrate animals without a back bone. Their teeth are with few exceptions

not dense, but shaped by food habit and jaw movement so as to be efficient in mastication. Commencing with this little animal which I hold in my hand and with which we are all familiar, the echinus, designated Aristotle's lantern because first described by him, we find that it has five teeth and five jaws, moved by thirty-five muscles. It subsists upon shell fish, and by the movement of these teeth with sharp cutting edges it drills a hole in the shell of its prey and sucks out the pieces. The echinus is an animal with primitive nervous organization, yet it has sense enough to have good taste, and by its liking for shell fish does considerable injury to the business of the oysterman. This is one of the most complete arrangements of tooth structure that is found in the animal economy.

Our next illustration we take from the common leech. We are all familiar with the manner in which this articulate makes its wounds. The animal has three jaws, which are simple semi-circles, and are armed with teeth or denticles not for mastication, but for cutting the flesh of its prey and making a wound from which the animal draws the blood upon which it lives. It shows the adaptation of the teeth to the necessities of the animal. The drawing upon the black board shows the jaws attached to the second segment and so arranged as to make a tri-radiate wound.

Among the intestinal worms, I may instance the tapeworm. You know how difficult it is to dislodge this disgusting parasite from the alimentary canal. It has a circular mouth armed with little hooks which seize hold of the walls of the alimentary canal and hold fast while the animal sucks the juices upon which it subsists. In that way these hook-shaped teeth aid the animal in obtaining its nutrition.

Then we come to the mollusks, of which the varieties described may be numbered by the thousands. We may divide them into two classes, those with and those without heads. The headless ones have of course no teeth; while the food habits of some with heads are without the neces-

sity for teeth, and hence they are edentulous. But in those that have teeth we find the variety in shapes corresponding with the difference in diet, so as the little mollusk lives upon vegetable, animal, or liquid food, the teeth quite as readily correspond to its necessities, as do those of the vertebrate series to theirs. So in these again we have this selective influence of function giving us structures in these plastic animals which are as fully adapted to their needs, as are those enjoyed by the higher animals, *teeth modified in shape, substance and arrangement by food habit*. The different materials upon which the teeth are required to act and the different movements of the tissues in which they are implanted, tend to produce that peculiar shape and structure which is most efficient for its nutrition.

Passing to the vertebrate, we have a large class of vertebrate animals whose teeth we know have been either modified or wholly lost by reason of changed food habits. Birds to-day have no teeth, yet Professor Marsh, of Boston, has described some fossil birds which were furnished with well developed teeth like those of other vertebrates. There is an immense variety of fishes, which are placed by Professor Marsh in five great classes; the leptocardi, marsipobranchi, elasmobranchi, ganoidei and teleostei. The first of these described by Haeckel as the acrania (without a skull) have no teeth, while the others have almost an endless variety. The marsipobranchi, of which the lamprey are examples, have pointed, horny teeth. The elasmobranchi, embracing the rays, sawfish, sharks, etc., have teeth with sharp points, peculiarly adapted to their habits of life, and so on throughout the whole series, furnishing a greater variety of tooth formation and attachment than any other class of animals.

Before leaving the fishes I want to direct your attention to this little toad fish which I hold in my hand. We find the body covered with spines, and a similar one in each jaw, except that their location has given them a different function and they have become modified by virtue of it.



This is an illustration of the dermal origin of the teeth, and is equally well shown by a newly hatched dog-fish, where at this age you can scarcely distinguish the spines located on the jaw from those on the dermal surface. These becoming modified by function, soon present a different appearance.

Next we come to the reptilia. They have but few teeth. A poison fang is remarkable for the peculiar arrangement for conducting the poison into the wound made by it. It would be much like taking an ordinary tooth with the enamel and dentine on it, and rolling it out flat and doubling it upon itself, the pulp cavity occupying its normal position. In folding it over we get a semi-canal connected with the sac of poison fluid at the end of root. The direction of the tooth is horizontal when at rest, but when elevated to pierce the prey a membrane is drawn over this semi-tube so that it makes a complete canal, and as the animal strikes its prey the pressure upon the sac at the root ejects the fluid through the canal into the wound made by the fang. Another peculiarity is that we have an endless succession of these fang germs, so that when one is lost another is developed in its place. This is true of nearly all the fish series; where teeth are lost by violence or injured by wear new teeth soon take their place.

I have here a peculiar specimen which represents the edentata, or insectivorous animals, an ant-eater, which is deficient in front teeth. The molars it has are little round pegs, made up of dentine without enamel. The front are deficient, yet in some of this group there is a lateral incisor, and in nearly all there are germs of both lateral and central incisors. They have not been developed for generations, yet the germ being present represents the original idea and form of development, although it is aborted. Loss of function has greatly modified the teeth of this animal; the relegation to the tongue of the function of the incisors has made those teeth no longer necessary, hence they have disappeared, only the germs remaining to indicate the former

type. The posterior teeth, having no hard substances to grind, have wholly lost their enamel. They are specialized for the services of the animal. This is not the true armadillo, although allied to that family.

As teeth are specialized by function and adapted to certain kinds of food they are usually reduced in number; so also as we go up in the scale of intelligence from the lower to the higher, increased brain development seems to have a similar influence, the ancestral animal usually having had a great number. Relegation of function brings diversion of nutrition.

Next in order comes a class of aquatic animals which includes the sirena or sea cow, an herbivorous animal living in the water, and is furnished with molars adapted to its diet. To this class of aquatic animals belongs also the denticle or sperm whale, whose teeth are strong and cone-shaped, giving us the idea of prehensile use, and ranging in size in correspondence with location in the jaw, the heavier ones being located nearer the articulation. Its prey is seized and swallowed whole. In the mysticete, right whale or balenide, the largest mammal, we find a set of teeth in embryo, but they are functionless and absorbed before birth. At birth, in place of teeth, are developed thin plates that run transversely across the jaw, some two hundred in number, and varying from ten to twenty feet in length. These great plates, which furnish the whale-bone of commerce, are attached to the upper jaw, and form a sort of fringe on their lower edge, in which, as the animal swims through the water with open mouth, thousands of small jelly-like animals, which abound therein, become entangled. The water being expelled, these are transferred to the œsophagus of the whale and become its food. These plates are an adaptation of teeth, specialized to the needs of the animal and serve it in its nutritional demands.

In the quadrumania, embracing the lower monkeys and lemurs, we have teeth for crushing fruits, tubercular teeth, and very closely allied to those of the human family,

but somewhat different in form, and in some greater in number, the cuspids being more prominent and serving the males for weapons in combat.

Then we come to the anthropoidea, a group that embraces man as well as the higher apes. This group has teeth alike, save in the prominence of the cuspids; but in this ascent in the scale towards man we lose some of the teeth, the lemurs and lower monkeys having thirty-six while the anthropoidea have but thirty-two; and it is a question worthy of consideration whether the frequent *absence* of the third molar in the human family is not in the same line of reduction, absence of function sending the nutritive current to other localities. It is probable that with a continuance of our present diet and manner of living it will not be many centuries before man will have twenty-eight instead of thirty-two teeth. It is also probable that this reduction will be facilitated by this effort of specialization, which is constant. Man is an omnivorous animal, and in his mode of living his teeth are not subjected to the use or the kind of diet which is best calculated to insure their health. If we had the opportunity of examining any large class of people who were now and had been for some centuries confined to a limited diet with little or no animal food, we should expect to find incisors well developed, cuspids somewhat suppressed, and molars assuming a more herbivorous type, having cutting tubercles and showing a tendency to the infolding of the enamel. We do know that during the period in this country when the negro of the South was confined to a coarse diet he had fine incisors and strong molars. His cuspids were not more prominent than is seen in the higher races. This we should attribute to the fact of his diet being largely granivorous and coarse. You know that in all strictly herbivorous animals the cuspids are either entirely deficient or are merely present in a transitional form. The carnivorous animals, whether aquatic, terrestrial, arboreal or fusorial in their habits, or whether occupying the polar or equatorial regions, are alike

true to their cuspids and carnivorous molars—illustrating again the influence of food habit.

The rodentia, of which this beaver is a very good type, have finely developed incisors growing, going from permanent pulps, and molars with transverse lines of enamel. These forms are the result of the gnawing habit, which necessities the antero-posterior movement of the mandible. Accompanying this is also the peculiar arrangement of the three hard tissues of the teeth, which always gives the incisor a sharp cutting edge by placing the enamel, which is most dense, on the external or labial surface, the dentine next, and the softer tissue, not unlike cementum, on the internal or palatine surface.

Now, Mr. President and gentlemen, I might continue these illustrations through every modification of the animal kingdom and show you that wherever there is a differentiation in the food habit, there is a corresponding one in mandibular movement, which is accompanied by a tooth formation resulting therefrom; and that the condylar attachment or articulation is so constant and true to the mandibular movement and tooth form that when once recognized there would be no difficulty in describing the movement of jaw and the tooth form belonging thereto.

In recognizing the conditions which induce morphological peculiarities and modifications in dental structures, we certainly have some light thrown upon a condition which might induce degeneration. In the one case, functional activity followed by healthy nutrition; in the other, functional inactivity, or the absence of function, followed by diversion or relegation of nutrition to other localities. In conclusion, gentlemen, let me once more impress upon you the importance of the influence of function as a prophylactic agent, and suggest that in our duty to our patrons we can render them no better service than by enlightening their understanding to this extent.—  
*Proceedings of the New Jersey State Dental Society.*

## ARTICLE II.

ELECTRICITY AND ITS APPLICATION TO  
DENTISTRY.

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BY DR. GEORGE C. BROWN.

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Thinking that a brief history of electricity would be of interest to you I have taken the liberty of going back to the earliest recorded accounts, as compiled by W. J. Lancaster, F. C. S., F. R. A. S. The first record he gives relates to 4,500 years ago.

At this remote period of our earth's history the Chinese were acquainted with the power possessed by lodestone of attracting particles of iron. Whether they knew of attraction and repulsion we cannot tell, and nothing is recorded of any further knowledge of magnetism or electricity until some 2,000 years later, or 580 B. C., when Thales, of Miletus, the founder of the Ionic philosophy, discovered that amber (electron), when rubbed, possessed the power of attracting particles of decayed leaves, pieces of straw, etc. Thales believed that amber was an animate body, and in fact regarded the world as a living being and that everything was derived from water.

Again another period of over 2,000 years elapsed without any important fact being recorded, when in A. D. 1576 Robert Norman discovered that when a nicely poised needle was magnetized the north end became apparently heavier, and the south pole had to be weighted to give again a true balance, hence the inclination of the magnetic needle was discovered by Norman. Some twenty-four years later, in A. D. 1600, Dr. Gilbert, of Colchester, wrote a small work in which he describes some new experiments, proving that other bodies besides amber had similar properties under like conditions. Among such substances he enumerates glass, resin, spars, gems, stones, sulphur, etc., and he first gave the terms North and South pole; also a

theory accounting for terrestrial magnetism. Although Dr. Gilbert's work was received with enthusiasm three-fourths of a century had nearly elapsed before anything worth recording took place, when in 1672 Otto Guericke announced his discovery of a machine consisting of a ball of sulphur, which, when rubbed by the hand, produced sparks of electricity. Three years later, in 1675, Sir Isaac Newton found that a glass globe was preferable to a ball of sulphur, and Sir Isaac also found that by rubbing a flat glass held a short distance above the table small bodies on the table were lifted towards it.

The 17th century closed without any further discovery being reported, and in 1729 Stephen Grey, a pensioner at the Charter-house, after numerous experiments, found that bodies were either conductors or non-conductors of electricity, and he conducted a current through wet string, the first experiment, leading on to the establishing of telegraphs throughout the world. Four years later, in 1733, Dufay discovered that conductors were non-electrics, and that non-conductors were electrics. He also distinguished between positive and negative electricity.

For several years after this period attention was directed to the perfecting of the frictional electric machine, the most important addition being, in 1740, the prime conductor, by Boze, of Wittenberg, and the fixed rubber, by Winkler, of Leipsic. Just after this, in 1746, Muschenbrock and his pupil Cunens, of Leyden, were endeavoring to electrify a flask of water which Cunens held in one hand, while a chain from the machine dipped into the water. After the machine had been turned some time Cunens, in the act of removing the chain, received a severe shock. This was the origin of the Leyden jar, and, as it was the first experiment proving that electricity could be stored, it will rank as the forerunner of all storage apparatus.

One of the greatest discoveries about this time was that in 1749 of Franklin, by which he obtained a parallel between lightning and electricity. After a considerable

number of experiments with a large battery of Leyden jars he, in June, 1752, during a storm, flew a kite having metallic points; with this, and a key attached to the lower end of the pack-thread and from this a silk cord attached to a tree, he obtained a considerable number of sparks; not until, however, the rain had saturated the thread. From these experiments Franklin invented the lightning conductor.

From Philadelphia we must travel to Pavia, where, in 1775, Volta invented the electrophorus. In 1782 he made the condenser and in 1799 he made his famous voltaic pile. While Volta was at work in experiments in frictional electricity, at the neighboring town of Bologna Galvani was making equally important experiments, but in an opposite direction. Thus, in 1780, Galvani discovered the contraction in a frog's leg when the crural nerve was connected to a metallic support and the electrical machine worked. At every spark he found a consequent contraction of the leg. In 1786 he obtained the same effect by the contact of two dissimilar metals, and after a great number of experiments, in 1791, he published a complete account of them, which led to a considerable amount of correspondence between Galvani and Volta. But the first to explain the true cause of the action in 1792 was Fabroni, of Florence, who enunciated the theory that chemical action was the sole cause. This theory was further confirmed in 1800-7, by Davy, who immediately had made a large number of cells, some 2,000 in all. A full and most interesting account of these cells, and the then remarkable experiments and researches made with them, may be found in the "Baberian Lecturer" of November 20, 1806, and November 19, 1807. In the latter one Davy foreshadows his discovery in 1809 of the electric light, which he obtained from two pencils of charcoal, each one inch long and one-sixteenth inch in diameter. The spark obtained when the points touched was increased to an arc four inches in length by the separation of the carbon points. Afterwards

an arc of seven inches was obtained in an exhausted receiver, and so intense was the heat that, Davy tells us, not only were the charcoal points consumed but also the platinum wire to which they were attached was melted and fell down in large globules.

Since that time only seventy-years have elapsed, and it will be quite impossible to chronicle one-tenth of the discoveries and inventions made in this period of time. A discovery of the utmost importance was made in the latter part of the year 1819 by Oersted, the then Secretary of the Royal Society of Copenhagen. He had, in 1813, published a work in which he hinted at a connection between magnetism and electricity, but it was six years later when he made the important discovery that a current of electricity passing through a wire over a magnetic needle caused the needle to deflect. The announcement of this experiment excited the greatest interest among all the philosophers of Europe, and in 1820 Arago invented the electro-magnet. Schweigger, of Halle, also invented the galvanometer, which Ampere first exhibited at a meeting of the Royal Academy of Science, and in the following year, 1821, Faraday discovered electro-magnetic rotation. The most important of the great discoveries of the noble Faraday was that in 1831, when he obtained electricity from the inductive action of terrestrial magnetism. In the year following, 1832, Pixii made the first magneto-electric machine, which was improved and added to in 1833 by Sexton, of Philadelphia, who made the bobbins to rotate in place of the rotating magnet of Pixii. The next important improvement was made by Siemens in 1854, in which he wound the wires of the armature longitudinally instead of transversely, as in the old machine. The first time the electric light was used in a public manner was in 1836, when it was used to illustrate the rising sun in "Le Prophet," at the opera in Paris.

My first knowledge of electricity being applied to dentistry was in 1859, when considerable interest was



awakened in the profession in its application to the extraction of teeth. Many claimed that the painless extraction of a tooth could be accomplished by passing a current through the tooth at the time of its removal. I cannot do better than to describe the apparatus of one of the advocates of this method. "This apparatus consisted of an electromagnetic machine with a metallic rod at the end of each cord, the rod at the positive pole to be connected by means of a steel hook; second, an extensor, which is a piece of flexible conducting cord about a foot long, with a metal loop at each end, one very small; third, a conductor, which is composed of a gutta-percha tube eight inches in length, and a piece of copper wire with a small piece of sponge at one end, the wire to pass through the tube and turn into a loop at the other end, drawing the sponge close up to the tube. The battery should be placed conveniently in rear of the chair. The mode of operating is as follows: Extracting a tooth, set the battery in action, place a rod in each hand of the patient, and pass the piston into the helix until the muscles of the wrists begin to contract slightly; note the position of the piston and withdraw it; take a piece of spool thread and pass it through the small loop of the extensor, and tie it into a loop, full large enough to pass over the tooth; cut off the ends, dip the loop into water, and slip it over the tooth, twist the cord until the thread is close to the tooth; take the rod of the positive pole from the patient; let him grasp the other (negative) in both hands, unhook the positive rod and connect with the extensor; the forceps may now be placed in position, and the current introduced by passing the piston slowly into the helix; if the patient winces the least, let the piston remain stationary a few seconds, then pass it still further, slowly and carefully, until the measure is obtained, that was passed through the hands, or is so strong as to border on the disagreeable. The tooth may then be removed deliberately, the slower the better." My own experience was that in a great many cases the shock was more painful than the extraction of

the tooth.

The first really practical application of electricity to dentistry was the Bonwill electric mallet, invented by Dr. W. G. A. Bonwill of Philadelphia, February 27, 1867. It was improved upon until 1876, and placed in its present practical shape in 1879. The first three forms had the stroke governed by clock-work ratchet, which would run an hour. Since 1871-72, the automatic brake has been upon the instrument, and has been made very compact. The first electric mallet weighed one pound, and had to be suspended from the ceiling; the last one weighs but five and one-half ounces, and is used in the hand with perfect facility. Of this mallet the report of the "International Electric Exhibition, Section XXIV, Electro-dental apparatus," says: "This section finds presented for its examination, first The Bonwill Electro-Magnetic Mallet. \* \* The Bonwill Electro-Magnetic Mallet, under the title of 'Historical Exhibit of the Electro-Magnetic Mallet, and the dental and surgical engines, by Dr. W. G. A. Bonwill of Philadelphia, Pa.' We have a most interesting series of ingenious inventions, indicating gradual advances towards a desired end. It seems to us, that to do them and the inventor justice would require more space than is at our command, but we equally feel that from the electro-historical standpoint, it behooves us to state the claims made to the section by the exhibitor. There were, first, that he is the original inventor of the first practical Electro-Magnetic Mallet for the filling of human teeth with gold, *automatically* by power; second, that he is the only one who has placed upon the same any improvements of any value up to the present time."

The transmission of power by electricity through a wire offering but a limited resistance has already been successfully accomplished. Since a dynamo-electric generator may serve also as an efficient electro-motor the invention of a thoroughly successful generator of electricity from mechanical power solved the problem of the recovery of a

large per cent. of this power from the electric current at a more or less remote distance. To the electric motor, therefore, we must look for the utilization of this power. In cities and towns where the electric light is used the motor is a power that can be used to great advantage. Its great value consists, First, from its portability, seeing that it need only be connected by means of a pair of thin flexible wires with the main supply cable. Second, from their small weight per horse power developed by them. Third, from the possibility of their being used at a considerable distance from the prime mover. Fourth, from their working to the best advantage when run at a high rate of speed, and so being especially suitable for driving quick moving machinery direct, without any intermediate gearing. But to those of us who cannot make use of the electric cable the battery is the next generator of the electric current that can be made servicable to us. But the subject of batteries is one so broad and far-reaching that I do not propose to go into any description of them. It is sufficient to say that we have before us several of the new and most approved styles that have been placed on the market. I am not prepared to say which is best, as each one has its good points, and the most singular part of it is that this subtle fluid can be generated from so many different elements, combined in such a quantity of ways, each producing the same effect, varying only in quantity. In regard to motors, the "Griscom" is the only one that has been especially adapted to use in the dental profession, but others are coming forward seeking recognition at our hands, among them I will mention the "Diehl" motor, which I have had much pleasure in watching from its conception, until now it claims a place among the things most needed in the dental office.

To say that a good motor adapted to our use would be received with pleasure, is putting it mild. When, by a touch of the key, our engine is driven at a speed of from two to four thousand revolutions a minute; then again,

when we have the apparatus, another turn of the key and the electric light breaks forth with the brilliancy of a miniature sun, enabling us to examine the mouth and teeth in a manner never conceived of before. Still another move of the key and the invisible fan is set in motion, cooling our over-heated brains and making the patient feel that their comfort is studied as well as our own.

I predict in the near future great results in the field of electricity as applied to our profession, so great, indeed, that were I to put on paper what I believe will be accomplished, I should be called visionary in the extreme. I trust that you will give the different appliances exhibited a fair and full examination, for I take great pleasure in saying that never before has so fine an exhibition of dental appliances been made at any dental society.—*Proceedings of the New Jersey State Dental Society.*

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#### ARTICLE III.

### ALVEOLAR ABSCESS.

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Whatever the cause, alveolar abscess is a suppurative inflammation of the periosteum, frequently resulting in the formation of a sac filled with pus at the apex of the root. In the early stages, the symptoms are simply those of periodontitis deep seated, but no great pain or tenderness on pressure, with frequently elongation, owing to the conical shape of the fang, the pressure resulting from the inflammation forcing the tooth out of its socket. If a patient were to come to you with the symptoms I have indicated, what would be your treatment? Manifestly, it would be your duty to do what you could to relieve the inflammation; but to do this intelligently, you must be sure of your diagnosis. First ascertain which is the suspected tooth. This is not usually difficult, as the tenderness will be a prominent system; then drill into the pulp cavity. Do

this in that part of the crown which will render the subsequent treatment easy, by having direct access to the canal. If, when drilling, tenderness should manifest itself—for alveolar abscess is not always associated with a dead pulp—it may be desirable to suspend operations and have recourse to medicaments applied to the gum, near the end of the fang. I have not found any external treatment as valuable as the application of the dental tincture of iodine. This is made by adding an excess of the crystals of iodine to the B. P. tincture. After several months the alcohol takes up a much larger proportion of the iodine. Associated with this, or in lieu of it, a stimulant may be applied; and lately we have had furnished to us from the depots a small felt plaster containing capsicum. This is applied one or more times for several hours each, and will generally be found to give a good deal of relief. But generally sensitiveness is not met with, and the drill enters the pulp cavity. Frequently at this point pus or blood will make its escape, and the patient will express a feeling of relief; but this is not always the case. The pulp cavity is at times found to be quite empty; it is then your duty to try and reach the seat of the trouble by means of a long fine probe through the tooth. Sometimes the sac can readily be punctured in this way; but generally you must be satisfied with reaching the apical foramen. If no discharge takes place on removing the probe, it will then be desirable to drill out the canal through the apical foramen into the sac beyond.

Where the pulp is dead, whether you wish to treat a case of alveolar abscess or not, take the first opportunity to cone out the canals, open fully into the bulbous portion, and from that open into the canals, first using as large a bur as the cavity will allow, and then follow this with a small size; then use the large nerve canal drills and ream out, say half the length of the canal. You can readily see the object of this cone-shaped orifice; it is to facilitate the introduction of the medicine and the subsequent stopping of the root. When the orifice is fairly accessible, the best

way to remove the *debris* from the canal is with a Swiss five-sided broach, the two smallest sizes made; this should have the point broken off, for a square point will, and a sharp point will not, allow you to push up the bit of cotton wood, or, what I consider far preferable, Japanese paper; the temper of the broach should be drawn by passing it quickly through the flame of a lamp, a blue color being what is most desired—in other words, a spring temper. The soft and extra soft nerve broaches of the depots I can find no use for. Wrap a minute bit of Japanese paper near the end of the broach and pass it into the canal, unwind and push it well in, then twist it on the broach again, withdraw and repeat. Sometimes it will take a dozen bits before all trace of discoloration disappears. This is equally necessary either for alveolar abscess or where it is desirable to prepare the canals for stopping.

For alveolar abscess, first fill the syringe with warm water, and after placing the point far up in the canal, wash it out by alternately compressing and releasing the rubber bulb; then draw all the water out and repeat with the peroxide of hydrogen. If bubbles appear, of course pus is present. Then introduce a solution of pure carbolic acid by means of the same syringe, filling the cavity near full; take a piece of softened red gutta percha, in bulk a little larger than the cavity, and by the use of a large flat-pointed instrument, nearly as large in diameter as the orifice, with considerable pressure force the carbolic acid, and if a fistula is present the carbolic acid will probably appear at the orifice. The presence of a fistula adds very materially to the probabilities of success, as it allows a free passage for the medicine through the seat of disease.

Should there be no fistula, the treatment is very much the same, except that, as it is difficult to force the carbolic acid into all parts of a closed cavity by the process mentioned, on account of the presence of air, resource must then be had to the fine probes, working the carbolic acid into the most remote parts. The cavity is then filled with

Japanese paper and the orifice stopped with paper soaked in sandarch. This ends the first dressing. The patient is directed, in case of pain, to remove the plug from the orifice. The second dressing is the same as the first; if a fistula is present, and you have been successful in forcing the medicine through it, it will in many cases be found to be closed, but two or more applications are generally necessary. Should it be impossible to force the carbolic acid through, resource must be had to either drilling through the nerve canal into the sac beyond, or to the production of an artificial fistula beyond by piercing the alveolus through the gum. This can be done with little pain by touching the gum with a crystal of carbolic acid before drilling, or preferably by the hypodermic use of cocaine, in which case efforts should be made to keep the fistula open by means of a piece of cotton wool until the treatment of the case is completed. It is seldom necessary to treat the tooth in this way many times; if the abscess does not readily yield to treatment, it will sometimes be found that persistent effort may cure it; but in these obstinate cases the tooth is often eventually lost. It will generally be found, however, by following the foregoing treatment, that eight out of ten cases will be successful.—ELLIOT, *Dental Record*.

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#### ARTICLE IV.

### IMPLANTATION—BOTH SIDES.

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[Drs. Weld, Clowes, and Allen in Odontological Society—Hill, Brockway, and Perry reply.]

Dr. Weld. I presume Dr. Younger would feel disappointed if he did not meet with some adverse criticism to stimulate him; therefore, I think he will excuse me if I criticise the practice somewhat. I have had some experience in the replantation and transplantation of teeth; have been through the same enthusiasm that Dr. Younger is

going through now, and I think he will finally go through the same disappointment which I did. I have replanted between seventy-five and eighty teeth, beginning six or seven years ago; and I do not believe there is now more than one of these eighty teeth in the mouth. I am therefore obliged to condemn the practice, except in places where it is absolutely necessary, in young persons. My knowledge of implantation, from the time John Hunter made a human tooth grow in a cock's comb, and my views of the physiological doctrine of repair, which differ materially from Dr. Younger's, lead me to say that, in my opinion, the practice of implantation is barbarous and worthless. I have read Dr. Younger's pamphlet on the "Implantation of Teeth and Pericemental Life." It is pretty hard to criticise it, for on the first page the gentleman states that it is not free from crudities. Now, a crudity is something raw, something undigested; and *that* the paper surely is. It contains many statements which are unfair and misleading, and many that are purely suppositions and unsupported by a single fact. The paper throughout is sadly deficient in all points relating to the physiological doctrine of repair, so far as I can judge. This practice which has been recommended to us will be discarded precisely as replantation and transplantation were discarded, and for the same reason. Three weeks from to-night I am to read a paper before the First District Dental Society on the subject, and shall do what I can to help Dr. Younger digest a subject which he admits in his paper is undigested, and I will give him the opportunity at that time to criticise me as I have criticised him to-night.

Dr. Younger. I am sorry to say that I shall be three thousand miles away at that time. When I go back to San Francisco it is my intention to investigate this subject with the microscope, and see what that has to say about it. I am not dubious about the result.

Dr. Jarvie. I would like to ask Dr. Weld if the failures of his cases of replantation were not the result of diseased conditions about the roots—alveolar abscess, for



instance.

Dr. Weld. Just the contrary. I became enamored with replantation, and the idea of crowning roots in this connection occurred to me, and I had special porcelain crowns made for the purpose. Probably fifty per cent. of all the teeth which I replanted were healthy teeth and had healthy environments.

Dr. J. W. Clowes. The unique operations shown us this evening are beautiful to behold, and, as illustrated by the presence of an intelligent and refined lady, are calculated to produce a favorable impression. They remind me of some which I saw several years ago when Dr. Weld was an enthusiast in replanting and transplanting teeth. At that time I was invited by him to see the wondrous results of his labors in this peculiar field. Cases were shown of work done months before, and apparently with success. Others were more recent and full of promise, while others still were accomplished in my presence with undoubting faith in their stability. I spent a forenoon in witnessing these results, and formed my opinion of their probable value. A month later, at one of our society meetings, as I entered the room Dr. Weld came up to me, still full of enthusiasm, and said, "In less than five years this will be the universal practice in our profession." "What practice will be universal?" I inquired. "Why, extracting teeth before filling them, inserting crowns on their roots, etc." I replied that I hoped not, for what I had seen at his office had affected me so unfavorably that the practice of those operations was something terrible to contemplate; that I went home after visiting him and scarcely slept at night from thinking of the mistake he had made,—the mischief he was working by his hands, and the influence he might have on others in leading them astray. "Ah," he said, "you make me feel badly." Through courtesy I had refrained from expressing any opinions before, but approached in this way, I could not withhold it any longer. Five years later I met Dr. Weld, and inquired if he still

practiced those operations. "Oh, no," he replied; "I have long since given them up; they were all miserable failures." I said, "that is just what I expected they would be." Ever since then I have had a high opinion of Dr. Weld, and consider him a sensible young man,—because he not only had the wisdom to discover what was wrong, but sense and pluck enough to take the right side when convinced of his error.

Dr. Allan. We can look at Dr. Younger's paper from two standpoints. One is the stand-point of fact; and the facts that we have seen to-night show that teeth can be implanted and made for a certain length of time to keep their place. Further than that I would not go with Dr. Younger. From a physiological view I think the practice will prove erroneous and misleading. I think Dr. Younger's description or theory of the way in which implanted teeth are retained in place is open to criticism. I am not aware that any distinct membrane has ever been discovered as lining the lacunæ of the bone; certainly such a membrane has never been demonstrated as lining the canaliculi of the bone; and there cannot be, therefore, even a minute portion of the pericementum tissue in the new socket that is made. But there can be a plasma thrown out, which will form an artificial cement, as it were, around the implanted tooth, and for a time hold it in place. But, just as certain as the laws of life and death prevail, there is incompatibility between living tissue and dead tissue, and the time will come when the living tissue will throw out the dead, and the implantation will be a failure. There can be no living union between dead tissue and living tissue. The teeth which Dr. Younger extracts and implants into new sockets in the bone have, he says, a pericemental membrane. Underneath that is the cement, which has been out of the mouth for some length of time. Dr. Younger cannot maintain that that is living tissue. The cementum is dead and the dentine is dead. But granting, for the sake of argument, that the pericementum covering

is not absolutely dead, the preparation which Dr. Younger applies—the bichloride of mercury—would certainly destroy any remaining life, as it acts directly on the protoplasm. This union that we see is most beautiful, but it is not a living one. Such operations are doubtful at best, and always dangerous.

Dr. O. E. Hill. Dr. Allan has stated that there cannot be union between living and dead tissue. He also states that if there had been any life in the pericementum it could not possibly survive the course of treatment to which Dr. Younger subjected it. I was anxious to learn whether there was any attachment between the gum and the implanted tooth which we have had the privilege of seeing this evening, and I gave Dr. Atkinson my pen-knife and asked him to try to ascertain. He did so, and reported that the gum was thoroughly attached to the tooth. The knife-blade was very thin, and he used it very carefully, yet the lady winced and the blood started in trying to separate the tooth from the gum. Does not this prove either that the pericementum of that tooth possessed life when implanted or that living and dead tissue do unite? I have seen Dr. Younger operate several times, and have each time been surprised to see how carefully, tenderly, and rapidly the teeth were implanted. I wish to call attention to one point in Dr. Younger's practice which seems singular to me. When he implants a tooth he expects it to become, within a week or so, a line or two shorter than it was when it was inserted; he makes allowance for that, and it does become shorter.

Dr. A. H. Brockway. I do not propose to spend time in discussing the question as to whether there is or can be a union between dead tissue and living tissue, but I wish to make this point: Here is an operation performed which is an apparent success. We have statements that similar operations have been made where success has obtained for as long as twelve years or more. The average of success undoubtedly has been several years, even under the un-

favorable conditions in which the operation has been many times performed. Now gentlemen get up and say that this operation can only be a failure. Failure is a relative term. We are all in the habit of speaking of our success in filling teeth. What is the average duration of our fine fillings? I fancy most of us would be ashamed to say, if we knew. It seems to me an operation that promises to endure successfully for at least several years, if properly done, cannot justly be considered a failure. Suppose the teeth are expelled after a term of years. What is to prevent the operation being repeated? Viewed in this way, it seems to me we have practically success in this operation.

Dr. Perry. I think the operation we have seen so well illustrated this evening may be called successful if the teeth last only three or five years. At all events, it would be hard to convince the patient that the operation is not a success. Whatever may be our learned theories, we must not shut our eyes to the accomplished fact which is before us in this lady's mouth. I have seen enough of Dr. Younger's work during the last ten years to satisfy me that, if any one can make a success of these operations, the delicacy and skill of his manipulations will enable him to do it. On general principles, I should be ready to sustain him in his practice of opening the apex, removing the pulp, and filling the root from that end. In replacing teeth I have never managed them in that way, but the idea, which I confess is new to me, is one I should favor. Treated in this way, there could be no chance of leaving any portion of the pulp at the apex to give rise to future trouble.—  
*Items of Interest.*

## ARTICLE V.

## EXTRACT FROM A MONOGRAPH ON LOCAL ANÆSTHESIA IN DENTISTRY AND MINOR SURGERY, BY PROF. GEORGE. VIAU.\*

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TRANSLATED BY L. TURNBULL, M. D., PHILADELPHIA.

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Dr Aubeau employs in his experiments a solution of cocaine, 5 per cent., that is to say, that in every Pravaz syringe containing a gramme of distilled water he dissolves only 5 centigrammes of cocaine, an insufficient quantity for cases where the roots of the teeth are firmly set in the alveolar process.

Mr. Telschow injects 10 centigrammes of cocaine, evidently too powerful a dose, as it produces general trouble in a number of cases.

Prof. Viau combines another local anæsthetic with a small quantity of cocaine, 5 centigrammes, which unites in acting with the cocaine without affecting the general health. This second substance is pure crystallized phenic acid. This acid neutralizes the effect of the solution of cocaine, and has been used with success. Mr. Telschow weakens his solution of cocaine with the phenic acid to neutralize it. The author finds an important agent in the acid, the anæsthetic properties of the pure or concentrated acid being known to all who have used it. It is the anæsthetic, *par excellence*, of intelligent dentistry. The author now describes his two modes of administering anæsthetics:

1. Anæsthesia by the aid of sub-mucous injections with a mixture of cocaine and phenic acid.
2. Anæsthesia by the aid of sub-mucous injections with a solution simply of phenic acid.

Local anæsthesia obtained by the aid of cocaine and

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\* Officer of the Academy, Professor of the Dental School and Hospital, Paris; Secretary General Association of Dentists in France; Member of the Council for the Direction of the Dental School.

phenic acid mixed.

Before beginning to describe this process, I should relate an experiment that I made for the purpose of investigating the properties of a solution of pure cocaine (alkaloid) in the pure crystallized phenic acid. In mixing one part of phenic acid and two parts of cocaine, heating it very slightly, a product of a syrupy quality is obtained, which retains the color of the pure phenic acid, but dissolved; that is to say, rosy; and the odor weakened by the acid. The taste on the contrary is decidedly modified. The phenic acid has lost its causticity and its peculiar taste. In using this product upon the gums or tongue a sensation of warmth is perceived with the taste of the weakened phenic acid, allowing the bitterness of the cocaine to penetrate. At the end of several seconds the taste and the odor of the phenic acid disappear completely, at the same time that the sensation of heat is perceived at the moment of contact, the taste of the cocaine alone remains, with complete insensibility to pain.

Have I obtained in this manner a phenate of cocaine, or have I produced a simple solution? I leave to those more competent the solution of this question.

However it may be, I have a product which fully answers my requirements. Below is a succinct description of my operation procedure, thus:

1. The filtered solution:

Crystallized phenic acid, - - - 2 gr.

Distilled water, - - - 100 gr.

2. Package of hydrochlorate of cocaine. A syringe of Pravaz, which contains a gramme of water, in which I made a slight modification by adding to the opposite side of the canula a shoulder piece, which enables me to hold it with greater ease and strength, with the index and middle finger, whilst I press the stem of the piston with the thumb. I have also invented sharp canulas of different lengths, which are absolutely necessary, in difficult cases of contraction of the jaws, to reach the wisdom teeth. I

dissolve, when required, 5 centigrammes (or 1 grain) of cocaine in 50 centigrammes (10 drops) of phenic solution and inject slowly half of the mixture into the "labial face," half into the lingual or palatine—at a point situated between the neck of the tooth and the presumed place of the extremity of the root, to within 2 or 3 millimetres of that extremity. I am careful to hold a finger, of the left hand, upon the puncture, to prevent the liquid from flowing backwards. The patient must then wash out the mouth with fresh water. At the end of three minutes the soft parts are completely insensible. A very deep puncture is no longer felt. Between the fifth and sixth minute I operate. This process has always given me complete results, as regards anæsthesia. As to general troubles I have never tried them. Sex and age appear to have no influence on the anæsthetic results. I have operated upon 30 males and 56 females—total, 86 subjects. It will be seen in the table of observations that several subjects have received the anæsthetic twice at the same sitting, without having been otherwise affected. These patients have, however, absorbed in a lapse of some minutes, 10 centigrammes of cocaine in a gramme of phenic solution. Other patients have undergone, with several hours' interval, two or three operations, always with success. I have also observed that the patients upon whom I operate for the second or third time have lost all fear. In submitting thus to the operation, it is evident that this facilitates many anæsthetic injections—a work requiring great precision. Observations show that the half of the ordinary dose of anæsthetic—that is to say, about 2 centigrammes,  $\frac{1}{2}$  of cocaine in 25 centigrammes of phenic solution—has sufficed to produce anæsthesia.

In conclusion, I think I will be able to diminish hereafter the quantity of cocaine, and to inject less liquid under the gums; altogether, obtaining a complete local anæsthesia for the extraction of teeth.

#### REMARKS BY TRANSLATOR.

In a recent lecture, delivered by invitation before the

Philadelphia Dental College, on Anæsthetics, we dwelt at considerable length on the great value of a true and successful local anæsthetic, recommending cocaine, and yet cautioning the use of a stronger solution in the eye than 1 per cent.; and for the extraction of teeth, 4 or 5 per cent., but in the ear and throat, a much stronger solution. Notwithstanding all precaution being taken, unsatisfactory cases will arise; patients of nervous or hysterical natures are subject to nausea and trembling, followed by depression, with loss of muscular power; and even comatose cases requiring powerful restoratives, while some state that no pain whatever is felt.

All interested are advised to read, with care, the unfortunate case on pages 49, 50 and 51 of the "Appendix to Manual of Anæsthetics."

We also stated that up to this time, December, 1886, no well authenticated case of death from cocaine has been reported, which was a subject of congratulation.

One sad death has, however, occurred in connection with cocaine; whether caused by it or not, remains a mystery, as the unfortunate operator destroyed himself. An extract from the *London Lancet* of an article taken from *Semaine Medicale*, gives some particulars of the fatal accident which led to the suicide of Professor Kolommine. The Professor had decided to perform an operation for the removal of tubercle from the rectum of a female patient, and inquired of his colleague, M. Louschinsky, what dose of cocaine he might administer. The answer was, that the maximum was 2 grains. Upon consulting special treatises, however, M. Kolommine found that 30 cases of anæsthesia were recorded in which the quantity given had varied between 6 and 96 grains. In a similar operation to that he proposed to perform, a French surgeon had given 48 grains. In consequence of these references, it was decided to employ 24 grains, which were introduced into the rectum by instalments. About half an hour after the operation, the first symptoms of poisoning appeared, and notwith-



standing the administration of nitrate of amyl, hypodermic injections, of ether, oxygen, and artificial respiration, etc., the patient succumbed.

Hypodermic injections of morphia do not seem to have been tried, and I do not know whether they have been recommended in cases absolutely similar to this.

I may mention, however, that I have seen symptoms of cocaine poisoning, in subjects of morphia habit, relieved instantly by a hypodermic injection of morphia, and in one case 5 grains of cocaine had been taken hypodermically, within ten minutes; and I have frequently seen the same antagonistic effect produced by a small quantity of cocaine, is an overdose of morphia. It is also to be regretted that strychnia was not tried in this case, for the experiments of Dr. Bignon have shown that cocaine is its physiological antidote, and it is quite possible that the antagonism may be reciprocal. Dogs poisoned by strychnia to the extent of 1 milligramme (a fiftieth of a grain) per pound, can always be saved by keeping up cocaine intoxication, until the elimination of the strychnia. See also the suggestion of Dr. Briggs, of New York, of the use of cocaine in tetanus and strychnia poisoning. (*Journal of the American Medical Association*, January 17, 1885, page 37; also Turnbull Appendix to Manual of Anæsthetics, page 62, last edition, P. Blakiston, Son & Co., Philadelphia.)

We were highly delighted to find from the pamphlet of Professor Viau that he had been able to modify the hydrochlorate of cocaine in solution with pure phenol, so as to prevent, in 87 cases, any unpleasant results from its use in the extraction of teeth. The solution was prepared as directed by the Paris Dental Surgeon, and before a class of about 200 students. The mixture was injected into the jaw, in a case of diseased antrum in a young lady. She was then operated upon by Dr. Garretson, who removed the diseased bone with the dental engine. She bore the operation with great equanimity, and with so little pain as to be unnoticed by the students; and when asked at the

completion of the operation, she stated that she experienced some slight pain. The case was an interesting one, in its freedom from excitement and haste, and the quiet way in which she would rise, expectorate the blood, and be cleansed from the horrible disfigurement, avoiding the great risk produced by profound anæsthesia, which is so nigh unto death, required in such an important operation.

A little girl was also operated upon, for the extraction of teeth; she cried when the hypodermic syringe pricked her, yet in seven minutes the very much decayed tooth was extracted without the slightest evidence of pain. We think this combination has a wonderful future.—*Dental Advertiser*.

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ARTICLE VI.

METAL WORK.

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BY DR. L. P. HASKELL, CHICAGO.

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Read before the Central Dental Association of Northern New Jersey.

As everything depends upon the foundations being correct, when a metal plate is to be made be sure the impression is right. I do not deny that good impressions can in some cases be taken with wax, and more in modeling compound, but there are cases where neither is so reliable as plaster of paris. It may be accepted as an axiom, that the more difficult the case to secure an impression the greater the necessity for the use of plaster. If one uses other materials, he must select the cases most favorable for each. I have found in a long practice that plaster being always reliable, and there being no tangible objection to its use, I secure the best results when I confine myself to it.

Believing that all that is necessary to secure successful results is to have the plate come in close contact with the membrane for adhesion, with a uniform pressure on the

gums in mastication and correct articulation of the teeth, the only change I make in the plaster cast is to raise it with a thin film of wax over the hard places, and scrape slightly the rear, between the center and corner of the plate. In order to have the cast deliver itself from the mould, I make the sides flaring all around, that I may secure the best results. I use the only metal which has all the requisites for a dental die—non-shrinkage, hardness, toughness, smoothness, with a melting point of low temperature. These are found in Babbit metal, made from the proper formula, viz.: one part copper, two antimony, eight tin, care being used to melt in the order named, so that the tin shall not oxidize. The counter die should be lead, with one-sixth of tin added, so as to reduce its melting temperature, lead melting out at a higher temperature than the Babbit metal. Coat the die with whiting before pouring the lead. It is seldom necessary to make a second die.

The principal point to guard against is the center, at the rear; see that, by pumping the moisture from under it, it sets snugly enough to exclude air, but not bearing sufficiently hard to irritate and throw off the plate.

The margins of the plate should be carried as high as they can be worn all around, especially over the cuspids. The plate will hold better, and it must be carried high over the cuspids in order to restore the lost expression resulting from the extraction of those teeth; but it must be lowered just back of them to allow full play to the muscles.

The use of gum sections is inadmissible in my practice, because I can not secure proper arrangement of the teeth nor of the gum, so as to restore the condition of the lips; neither can proper articulation of the teeth be secured with them. Using plain teeth, then, we must use a rubber gum for attachment to the plate. I solder platinum loops to the plate to hold the rubber, fastening one end only.

As much depends upon a correct antagonism or occlusion of the teeth as upon the fit of the plate, and many cases are failures from a faulty antagonism when every-

thing else is right.

The six anterior teeth should never meet. The pressure should be upon the bicuspid and first molar, and always be equal upon both sides. If there is a lower wisdom tooth (the first and second molars missing), it usually inclines forward, and should be avoided entirely, because if it meets the upper tooth at all it crowds the plate forward, constantly increasing the pressure as the jaws come closer together. If there remain upon the lower jaw the six anterior teeth and one or two bicuspid upon one side, and no teeth upon the other, the sooner they are removed the better for the interest of the patient, for the reason that the closure is one-sided and the plate is constantly displaced. The insertion of a partial lower set would not help matters, because very soon the artificial teeth would yield to pressure and be too short, and the uppers would meet only the natural bicuspid remaining.

The position taken by some dentists that the natural teeth should be allowed to remain under all circumstances, is a mistaken policy, resulting in great discomfort to the patient in many cases.—*Independent Practitioner.*

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#### ARTICLE VII.

### THE MATRIX IN FILLING TEETH.

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The matrix is rapidly gaining favor, and we believe its intelligent use adds largely to the perfectness of many fillings, and renders operations that are difficult and tedious without its use, comparatively easy and more complete when finished. It gives an easy restoration of natural approximation, with unnecessary separations or wedging, and this is a great point gained. Many operators who experimented with the forms put upon the market at first, were not impressed with the benefits of the system. This result was occasioned partly by the imperfect form of

matrices, but chiefly because they were not properly used, and the result was imperfect fillings at one or both of the lateral walls near the cervical border. The fault was in using instruments not adapted for reaching these points, and by the use of cohesive gold. Non-cohesive gold should be exclusively used, until the cavity is nearly full, and each piece of gold should be placed to extend from the lateral or cervical border to the interior of the cavity, and condensed firmly against cervical and lateral borders, and against the matrix and evenly carried up until the cavity is two-thirds full or even more, then finish with cohesive gold. In using the last pieces of non-cohesive do not condense thoroughly, and be sure that the first pieces of cohesive gold added are thoroughly malleted, and secured to the non-cohesive with a sharp pointed plugger.

Formerly the matrix was made only in forms to be secured between two teeth, but while these forms have been greatly perfected, there are now additional forms of matrices designed for a greater variety of cavities. Band matrices designated for teeth that are isolated, and for cavities in the buccal and lingual surfaces, are now made in a variety of forms, and all designated to facilitate the filling operation.

We desire especially to call attention to the admirable way in which the matrix supplements the efforts of the operator, when cement or amalgam fillings are used. In filling cavities with these plastics without the matrix, the filling placed in the deeper part of the cavity is displaced and pressed out by impaction nearer the orifice of the cavity, and the proper contour is obtained with difficulty, and at a sacrifice of solidity and proper joint at some point because there is no wall of resistance. With the matrix this is all obviated, and a more solid and properly contoured filling is the result. In using cement the surface of the matrix next the filling must be slightly rubbed with oil to prevent the cement adhering.

We consider the matrix especially adapted for these plastic fillings, and if the operator who does not use them

will commence with their use in the plastics, he will not be able to get along without them; and while he will find that with gold greater care must be exercised, yet we are satisfied that he will find, that when they are rightly used he will accomplish in very many cases better results with less expenditure of time and brain, and with less pain and exhaustion to the patient.—*Western Dental Journal*.

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## Editorial, Etc.

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**DAILY LIFE IN A DENTAL INFIRMARY.**—The reporter of one of the prominent daily papers gives his experience as a sight-seer in a Dental Infirmary, and as his account will answer as a description of the scenes of such an institution generally, we give the following extracts :

"The exterior of the building is so harmless and inoffensive in appearance that few persons would suspect that behind those walls are concealed something like one hundred and fifty human beings, the majority of them young men, engaged in mastering the technicalities connected with the preservation and extraction of molars, bicuspid, incisors, canines and all the other things in the mouth to which the scientists have given such terrible names, and which, on occasion, ache so like the late Samuel Hill. Is it not a dreadful thought? One hundred and fifty men about to be turned loose upon the inhabitants of this city, to establish 150 dental rooms, to smile blandly upon 150 patients who come timidly in, holding on to their jaws; to pop them into 150 chairs and say "Open your mouth—a little wider, please;" then silence for a moment; then 150 shrieks to rend the air, followed presently by an equal number of long-drawn "ahs!" expressive of immeasurable relief. It almost takes away one's breath to think of it.

But in the meantime, before those students become full-fledged dentists, they must have patients to practice on. And

as few persons care to pay fancy prices for the sake of advancing the general cause of dental science, while at the same time incurring the risk of having their jaws broken or of inadvertently swallowing improved styles of forceps, it follows that the faculty of this institution has made the charge for all work done there very low (merely enough to cover the cost of the material used) to afford the necessary amount of inducement. Knowing, therefore, that visitors were not so infrequent as to excite comment, and observing several persons entering with that uncertain gait and troubled expression of countenance which marks the dentist's prey, a reporter, backed up by an intrepid artist, ventured into this place the other day to see what there was to be seen. The rumors afloat concerning the sad fate of various rash intruders into the stronghold of these embryo alveolar-tissue lacerators were powerless to deter them. Armed with an accident policy for one day, and with note-books and pencils carefully concealed, they ascended a flight of stairs and entered a long, narrow room containing about a dozen chairs of a kind but too familiar to need description. They were occupied by twelve unfortunates, mostly females, in various stages of unhappiness. There wasn't cheerfulness enough diffused over all their countenances put together to make up one single sickly defeated-candidate-the-day-after-election smile. But there was enough cheerfulness on the faces of the operators, as well as on those of the other students who were visible, to rather more than overbalance the gloom that otherwise characterized the proceedings. The reporter was very kindly received by an elderly gentleman with keen eyes and an encouraging smile, whose affable reception of visitors had a noticeably tranquilizing effect upon their nerves. Every facility was afforded for examining into the workings of the institution.

By rare good fortune the artist recognized a friend in a six foot student, who was watching a young man run a buzz-saw between the teeth of a neatly dressed and rather attractive young lady. He consented to act the part of cicerone, and under his guidance and protection the twain made the tour of the premises, beginning with the extracting-room. That is, they began with it after a while, but not quite immediately,

for on trying the door it proved to be locked, and various hollow groans and muffled cries from beyond conveyed but too plainly to the listeners the fact that some student was adding to his information as to the ratio between his dexter arm and some decayed premaxillary grinder. When the student had concluded his operations the door was opened. About a dozen students were gathering around the operating-chair, and a young woman in a state of collapse was departing. The students seemed to be having a little discussion as to whose turn it was to have the next "crack" and waved various dreadful-looking instruments of torture about them in an alarmingly careless manner.

Leaving this ensanguined field the exploring party ventured next into the third story. Here was another large room, with more chairs and more unfortunates. All the chairs were full and the students were working away for dear life. The professors look at the patient's teeth before the student begins to operate and after he has completed his work. If it is satisfactory he receives a mark in accordance with the excellence of his work. If it is not good he has to take it out and do it over again. This, the reporter was informed, did not very often happen, but when it did it was apt to engender ill-feeling between the operator and operatee. Adjoining this was a large room devoted to the manufacture of plates and sets of teeth. In one corner of the room was a furnace about as hot as a crematory to full blast. The student led the unhappy visitors directly to this, and planted them within six inches of it while he gave them all the details he could think of concerning the institution.

The Professors afterwards took the visitors in charge and showed them the museum, containing among other things casts of the heads of persons upon whom remarkable dental and surgical operations had been performed by the faculty of this institute. There was the case, for instance, of a young man whom they called "Tommy," who, through some cancerous affection, had lost his entire nose and all his teeth. As shown by the cast, he must have been a hideous object to gaze upon. The middle finger of his left arm was bound down upon his face, the skin opened and left there until it should



unite. When union had taken place the finger was cut off at the first joint, and the man had a very tolerable-looking nose at the expense of a finger.

The Professor was interrogated as to the nationality of the students. He replied that they came from all parts of the world. The course takes two years. Each student works three days filling teeth, two days making plates, and one day at extracting. This, with the lectures and subsequent copying of his notes and reading text-books, fills out his week very thoroughly. The course embraces, besides instruction in dentistry, a complete course of anatomy and the science of medicine. One would naturally suppose that the institute would be patronized almost exclusively by the poorer classes, but this, the Professor stated, was not the case. Many persons who were abundantly able to pay the highest prices came here for the reason, he presumed, that they were sure of getting honest work. Another class of visitors whom they would like to exclude, but could not, were young women of flashy attire and not irreproachable morals. Most of them had nothing the matter with their teeth, and just wanted them cleaned a little to give them a chance to make the acquaintance of the "boys."

All the students carry about with them little diagrams which look like a small stockade-fort erected for protection against the Indians. But it is intended to represent all the teeth in the human head, first and second sets. Every patient receives one of these pictures, with the tooth or teeth to be operated on marked on it by the Professor, and the student works with this as a guide. He cannot touch a tooth that is not marked on this chart.

While the reporter was examining a chart that had 17 teeth marked to come out, a student with a very determined expression of countenance took the card from him, under the impression that he had just received it in the regular way from a professor, and, with a smile intended to be reassuring, sought to crowd him down into an operating chair. The reporter fled with never a backward glance.

**THE VALUE OF A NAME IN DENTISTRY.**—The name of the American dentist, Thomas Evans, who has resided in Paris many years, is well known throughout Europe and the United States. Under the empire he was the court dentist, the Emperor and the beautiful Eugenie, and perhaps also the Prince Imperial, submitted to him the care of their teeth, and when, after the disaster of Sedan the third republic was proclaimed and Eugenie withdrew precipitately from Paris, it was the dentist Thomas Evans at whose house she took refuge, and who escorted her to England. Many of the royal and princely families of Europe patronized Thomas Evans, and as matter of course fashionable people and wealthy Americans abroad followed their example. The name of Evans became famous, and the dentist Evans became very rich. Being overburdened with business, he took into his office his nephew, John Evans, not as a partner but as an assistant, making many promises as to what he would do for him. But the nephew, John Evans, who was himself a skillful practitioner, becoming finally weary of promises, left his uncle and set up for himself. From that time there was a bitter war between the two. The elder Evans determined that no rival Evans, even though he were the son of his brother, should attract the favor of the public and share his fame. This happened before the fall of the empire. The younger Evans was the son of Rodolphe Henri Evans and Elizabeth d'Oyley. The mother being of noble birth, John Evans on his marriage sought and obtained in 1879 from the Court of Common Pleas of Philadelphia authority to change his name to John d'Oyley, and on his return to France assumed the title of Marquis d'Oyley, as it appears he was warranted in doing in right of his mother. It was on this change of name the elder Evans fought his battle. He sought at first the intervention of the Emperor to compel John Evans to abandon the name of Evans in his practice as a dentist, and compel him to use the name of d'Oyley, by which he was known in society. As the Emperor declined to interfere, the elder Evans took the case into the courts. The fight thus commenced has been going on, according to a Paris chronicle, for twenty years—"twenty years of intestine struggles, of vexations and gnashing of teeth." The first suit the

elder Evans lost. The second, to interdict his nephew, John Evans, from bearing the name of Evans and constrain him to call himself Marquis d'Oyley, the uncle gained. John Evans then appealed to the Third Chamber of the Court of Paris. He only desired, he said, to have the right to call himself John Evans d'Oyley. The court appears to have appreciated his modesty. It gave him more than he asked. It decided that, in the practice of his profession, he had the right to use the name by which he was baptized, and that of Marquis d'Oyley in society and among his friends. The elder Evans was condemned to pay the costs of the suits he had instituted. So ends at last a quarrel that has long been the talk of Paris.—*Sun.*

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## Bibliographical.

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A SYSTEM OF DENTAL SURGERY.—By Sir John Tomes, F. R. S. Third Edition. Revised and enlarged by Charles S. Tomes, M. A., F. R. S., with 292 illustrations. Publishers: P. Blakiston, Son & Co., Philadelphia, 1887.

This old and well-known work in the form of a new edition, has been recently published, in which some of the sections of the former edition have been omitted and other new ones added, comprising thirty pages and twenty-nine illustrations. While this work might not meet the requirements of the dental student as a text book, on account of its not being comprehensive enough for such a purpose, yet there is much useful information to be found on its pages, which will prove valuable to every member of our profession. Some fourteen years have elapsed since the appearance of the second edition which, on account of the rapid and material development of the science of dentistry, has rendered necessary considerable revision and change. We still notice the retention of old and obsolete words, which are at variance with the improved nomenclature of our literature.

The portion of the work relating to dental histology has been somewhat changed to conform to the latest investigations, but not to the extent required by recent discoveries. The inflammatory or vital theory of the causes of dental caries is yet adhered to, although the solvent action of acids is admitted to a certain degree. The portion of the work treating of irregularity of the teeth is perhaps more advanced than any other, although the unsafe practice of torsion is yet advocated. The various forms of irregularity, however, with their causes and phenomena are ably treated. A very considerable portion of this work is devoted to oral surgery, and the treatment recommended for devitalized teeth is by no means encouraging. On the other hand the treatment of exposed pulps and the use of plastic materials for filling teeth present some valuable suggestions, and care is observed to avoid the extremes of conservative treatment. The concluding portion of the work is devoted to some methods of pivoting illustrated by cuts, and constitutes a valuable, though brief chapter. American methods are explained and generally recommended throughout the entire portion of the work relating to practical matter.

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## Monthly Summary.

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### A METHOD OF FILLING VERY FINE ROOT CANALS.—

The small labial canals of the upper molars, and of double rooted bicuspidis are rarely diseased, and if they are once thoroughly filled are almost certain to remain healthy. As for various reasons it is difficult to fill these and other fine canals thoroughly with gutta percha cones, the following method may be successfully employed. For the purpose of removing the dead pulp tissue, for carrying in the disinfectant fluid and for the subsequent drying of the canal, a very fine Swiss or piano wire broach, wrapped with a few fibers of cotton, must be used.

The canal being in the condition for filling, the gutta-percha solution should be worked into it with the same broach which was used in its preparation.

A piece of gold wire finely tapered to fit the canal approximately should then be carried in the foil pliers to the opening in the canal; this opening will be easily found by gently feeling about with the point of the wire in the proper locality. Having previously been cut to the proper length it can be gently pushed in until it and the solution of gutta-percha have completely filled the canal. A large, curved and deeply serrated plugger will be found useful in pressing the tapered wire home. The tapered wire points should be made of different sized 18-carat gold wire filed down to a fine gradual taper and cut off in various lengths. In selecting a wire point for any given case, the size and shape of the broach used in the preparation of the canal, should be the guide.—*The Dental Review*.

[The merits of Iodoform as a disinfectant and antiseptic are nowhere better shown than when it is employed in root canals. If it is rubbed into a paste in any suitable vehicle, and carried into small root canals on a few fibres of cotton by means of a fine broach, forked at the end like a fine two-pointed plugger, it will do excellent work. Roots thus treated rarely take on inflammation, and the persistence of the Iodoform is such that it will be easily recognized if the cavity is opened years afterward.]—*Ex*.

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MY METHOD OF BRIDGE WORK—*By H. W. Runyan, D. D. S., Eaton, Ohio.*—There is no doubt that bridge-work is very valuable in many instances, for partial dentures. But the great cost of the gold process places it within reach of comparatively few, while there are fewer practitioners of dentistry that thoroughly understand the swaging and soldering of gold that is necessary in the construction of the gold bridge-work. The method here described will place it within the reach of all who can afford a plate of any kind, and it can be constructed by any one capable of making a vulcanite plate, and I think it will last as long as any bridge-work, or as long as

the roots, to which it is attached, will last.

**PROCESS OF CONSTRUCTION**, for a case where the four incisors are missing and the cuspid roots remain:

After cutting the cuspids down to, or a little above, the margin of the gum, prepare by drilling out the canal with an inverted cone bur, and then a pointed fissure bur. By so doing a perfect funnel-shaped canal is formed, which gives strength to the work, and facilitates access to the end of the root. Take a platinum bar long enough to reach from one root to the other, and bend at right angles to form the pins. Now set the bridge support in place, after bending to conform with the gums, and take the impression and articulation. Make the model, place on the articulator and wax on vulcanite teeth. Remove from the articulator, flask and vulcanize, after covering all the rubber with vulcanizable gold.

Gum teeth can be used for the bridge between the roots, if the alveolar process has been absorbed very much.

After vulcanizing, clean up and fasten in by placing a little cement on the pin that extends into the cavity formed by the fissure drill. The rubber will fill that part formed by the inverted cone.

Use the best rubber, run the vulcanizer up slowly to 300° Fah. and vulcanize for one hour and fifteen minutes. You will have "a thing of beauty and a joy" to your patient and yourself.--*Ohio Journal of Dental Science.*

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**BLEACHING TEETH.**—There are many methods of performing this every-day operation; some good and others very bad. Teeth may be bleached with hot air, by electricity, with peroxide of hydrogen, but no single method can be used satisfactorily for all cases. A correspondent desires some information on this subject, and we present the following as one method:

After the root has been filled, and the tooth is free from tenderness, apply the dam, dry the cavity, and remove all discolored decay. Wash the cavity several times with fresh peroxide of hydrogen, and place a few crystals of chloride of alumina in the cavity (this may be procured of E. H. Sargent

& Co., Chicago,) moisten them with peroxide, and wait from three to five minutes, wash the cavity thoroughly with distilled water, then apply a solution of thirty grains of borax to the ounce of water, until the acid is entirely neutralized. Dry the cavity with hot air, and paint the interior with copal-ether varnish. When it is dry, mix oxychloride of zinc of the desired color, and fill the cavity full; allow it to harden, then prepare the cavity for the gold filling, and fill at once. It will be noted that the whole operation is to be made at one sitting, and that oxyphosphate of zinc is not recommended as a lining for the cavity, or base for the gold filling. In the central and lateral incisor teeth we have glued white unruled note-paper to the labial walls with varnish, then covered it with oxychloride, and afterwards filled with gold, and had a good result as regards color. A cause of failure is the performance of the operation on different days, thereby allowing moisture from without to gain entrance to the cavity, and contaminate the oxychloride. Never use a steel instrument when mixing it, and always allow the water of crystallization to be seen on the surface before cutting into it. Follow these procedures, and you will be surprised at the results.—*Editorial Dental Review.*

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**TEETHING.**—In this country, as well as elsewhere, a large proportion of fatal cases in which death has resulted from various primary causes, are promiscuously registered under the heading of *teething* and convulsions. These designations are utterly unsatisfactory, inasmuch as they convey absolutely no idea of the real cause of death. Teething, on the one hand, is a physiological process, a phase of normal growth, which coincides, to be sure, with a period of danger to health and life, *weaning*, but which probably stands in no casual relationship to the diseases which may then prove fatal. It is safe to assert that the numerous deaths everywhere imputed to this imaginary cause are merely illustrations of inadequate diagnosis. Convulsions, on the other hand, are but a frequent epiphenomenon of serious or fatal infantile disorders. They generally occur either at the first onset of some acute disease, whose ulterior symptoms do not have time for full development, or escape attention or recognition, or else they constitute the closing scene of antecedent disease of short or long duration. In such cases "convulsions" should no more be made to do duty in registration as the "cause of death" than asphyxia by bronchial mucus, which in adults is so often the ultimate phenomenon of disease and the direct mechanical cause of the cessation of life.—*Buck's Hygiene and Public Health.*

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## ARTICLE I.

### THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The usual Monthly Meeting of this Society took place on the 4th ult., Mr. Charles Tomes, F. R. S., President, in the chair.

A suggestion from the Council that Mr. Bland Sutton and Dr. Dudley Buxton should be elected Honorary Members was very cordially received.

The Curator announced several additions to the Museum, amongst them the skull of a young deer, in which the teeth and alveoli were much affected by disease.

Mr. Walter Harrison showed a model of an extreme case of double hair lip in a child five weeks old, operated on, with removal of the intermaxillary bones, by Dr. Whittle, of Brighton.

Mr. Penfold showed exact copies of instruments found at Pompeii, and preserved in the Museum at Naples, where they were labelled, "Dental Instruments," but they bore no resemblance to instruments now used by the profession, and Mr. Penfold was of opinion that they were intended for modelling clay with.



Dr. W. St. George Elliott showed a slight alteration in the Hodge Right Angle which he had made, with a view to overcome the tendency of the points to drop out. It consisted in attaching to the cover of the screw the lock-pin of the early S. S. White Right Angle, and the arrangement effected the desired result.

Mr. Ackery showed a pair of forceps designed by Mr. T. W. F. Rowney, of Derby, for dividing lower molars after their crowns had been removed. He also read notes of an obscure disease of the upper jaw in a medical student, aged 26, attended with numerous abscesses, which, after lasting five years, was cured by extraction of the first and second left upper molars, and carefully dressing the necrosed alveoli with aromatic sulphuric acid.

Mr. C. V. Cottrell showed models of the mouth of a youth aged 17 to 18, who had no illness from the time he was twelve months old. Previously to that he had had an attack of dysentery. His teeth were very yellow and perfectly soft, so much so that they could be cut with a knife. An uncle on the father's side had very similar teeth.

Mr. R. Hepburn had seen a similar discoloration result from the administration of acids.

Dr. Walker showed, on behalf of Mr. Humphreys, of Birmingham, the head of a calf with cleft palate extending from the inter-maxillary bone and palate portion of the superior maxillary bone. The two halves of the lower jaw were disunited, and the tongue was also bifurcated for some distance. The animal was otherwise strong and well.

#### ON THE PATHOLOGY OF RIGGS' DISEASE, OR PYORRHOEA ALVEOLARIS.

By F. NEWLAND PEDLEY, F. R. C. S., L. D. S. Eng.

We must all admit that it is a very unfortunate thing for a disease to be christened after the name of its discoverer, for there is always doubt whether his description

was correct, and even where it is shown that the original interpretation was entirely wrong, the name may long survive to perpetuate blunder and bar the road to a more accurate perception.

How much greater does the difficulty become when a lesion is named after a man who never recorded a description of it.

In the year 1881, at the Medical Congress, Dr. Riggs denied that he had been personally instrumental in attaching his name to the complaint. But we are aware that Dr. Riggs invented a series of instruments for removing tartar buried beneath the gum, and hence the use of his name would wisely be confined to describe a form of treatment by scraping, directed against certain abnormal conditions of the gums, which he recognized as peculiar, but attributed to the effect of tartar.

Years went by and the designation Riggs' disease was retained, although it was used with quite a different meaning to the original, by many who applied it to a lesion of constitutional origin, and not necessarily associated with salivary calculus. To obviate this confusion, the appellation pyorrhœa alveolaris was substituted for Riggs' disease. This more recent name is not free from the objection of being a generic term merely indicating a symptom, and it requires a sharp definition to intimate in what sense we elect to adopt the title. For the general acceptance of the term pyorrhœa alveolaris, by dentists in Europe and abroad, assumes that we all recognize a certain definite disease to which it is applicable, and when a distinctive title is given to a complaint, a definition should be forthcoming, which in turn should be based on its pathology. Unhappily pyorrhœa alveolaris received a compromising name first, and still lacks a satisfactory pathology. In this dilemma we must, to-night, select the salient physical features and naked-eye appearances upon which we rely to distinguish this particular disease from others to which it bears points of resemblance, to do duty as a defini-

tion, and serve as a fixed point from which we can discuss and develop its pathology. Eventually I trust we shall be able to endow the lesion with a name of scientific import.

The local conditions to which the terms "pyorrhœa alveolaris" or Riggs' disease have been applied may be briefly quoted thus from the description of well-known authors. The mucous membrane, especially that adjacent to the teeth, appears deeply congested with venous blood, tumid and thickened, but not filling up their interstices at their necks, and detached for some distance from the surface, from the fangs. A thick foetid discharge may often be pressed up between the teeth and mucous membrane which gives to the breath a very repulsive odour. This conditions of things continuing, the alveoli become absorbed, and at times more or less denuded, whilst the fangs of the teeth become coated with a layer of thin, hard, green-brown tartar. Ultimately, the disease progressing, the teeth one after another drop out. The alveolar margin is sometimes thickened in substance. The pain varies, it may be neuralgic from the first, but it is not generally considerable until the periosteum is fully involved.

Various theories have been advanced in explanation of the appearances and conditions occurring in the above complaint. I do not purpose going deeply into the germ theory. Doubtless numerous varieties of germs have been found in the purulent discharge from the alveoli, and an epidemic form of the disease is said to have appeared in Switzerland, and to have disappeared as rapidly as it came. The discharge contained peculiar micro-organisms, but the researches of modern bacteriology would not justify the conclusion that these germs were necessarily the cause of the disease; for even in the case of the well-known bacillus of tubercle, the question remains to be decided whether the bacillus is the cause or effect of the complaint.

American literature supplies us with a "catarrhal theory" for pyorrhœa alveolaris, based on the fact that the alveolodental membrane is continuous in structure with the

deeper layer of the mucous membrane. It is suggested that catarrh of the mucous membrane of the mouth causes sloughing of the alveolodental membrane by cutting off the blood supply. A serious objection to this is that the chief vascular supply to the lining membrane of the alveolus is not derived from the mucous membrane of the mouth. We need also tarry little over another point, which consists in the statement that in some cases of pyorrhœa alveolaris pus was absent. Little importance need be attached to this, for the amount of pus formed is merely an index of the intensity of the inflammation, and the vascularity of the part. Chronic inflammation may well exist without pus, or the pus may be present, though invisible to naked-eye examination, or may be entirely absent at times, though present and visible at others.

The relation of salivary calculus to pyorrhœa alveolaris is a question of great moment, for, in the opinion of many dentists, tartar is the origin and essential cause of the complaint. This is obviously unsatisfactory as regards the ordinary crusts of calculus that are so commonly found clothing the crowns of teeth. All dentists see innumerable cases of this description, in which the gum and socket may recede as the result of the mechanical irritation from the calculus; but there is no considerable separation of the periosteum from the root of the tooth, and simple removal of the tartar and attention to cleanliness arrests the progress of the evil. But grave attention is frequently drawn to a thin layer of calculus that is found upon the roots of teeth, extending upwards beneath the inflamed periosteum of the tooth, and in some cases reaching the very apex of the root. The characters claimed as distinctive of this layer of deposit are that it is nodular, harder, and of a different colour to ordinary tartar; but it must be remembered that the calculus deposited beneath the periosteal pouches is subject to different conditions to that on the exposed portions of the tooth. Old tartar is often hard and nearly black in colour, and that which forms beneath the margin of the gum

remains protected from removal by accident, mastication, or the use of a tooth-brush. Tartar mixed with pus is green. The nodular character of the deposit is probably attributable to the irregularity of the surface of the alveolus, and of the inflamed lining membrane, in contact with which the nodules are formed. The fact must not be disregarded that the deposit on the submerged roots is braided during its development with pus and effusions from the inflamed periosteum and gum. The difference in colour is not irreconcilable with the salivary origin of the deposit, when we remember how vastly tartar varies in shade under altered conditions, and in respect of its age; yet a formidable theory has been based chiefly on this variability of colour, which ascribes a "sanguinary" or "serous" origin to the nodular deposits that form beneath the margin of the gum.

Dr. Ingersol, an American dentist, discovered an "induration of granular formation" at the apex of a tooth that he had extracted, and he affirmed that he subsequently observed twenty such cases. Analysis showed dark colouring matter in these formations which, in his opinion, were only found in connection with ulceration, and this material he called "sanguinary calculus," because he inferred that it could not have come from the saliva.

To establish his point it would be necessary to prove that these calcareous deposits were entirely inaccessible to saliva. It is an eloquent coincidence that the analysis only differed from salivary calculus in the presence of colouring matter, and, granting for the moment that this were effused as some form of hæmoglobin from the capillaries of the inflamed periosteum, it would not necessarily follow that the calcareous deposits came from the same source. None would be prepared to express surprise that an irritated periosteum should occasionally deposit on the root of a tooth small masses of calcareous material, similar in nature to callus or osteophytes. In the vast majority of instances the nodular deposit on the roots of teeth is plainly observed

to progress in a direction from the cervix towards the apex, and not the reverse. It may here be mentioned that tartar has never been seen upon the surface of an unerupted tooth.

One other form of salivary calculus should be referred to, and that is the annular collection of hard dark material that is so often found beneath the free edge of the gum. Its formation and longevity are favoured by the protection of the margin of the gum, even in the mouths of many patients who give scrupulous attention to the use of the tooth-brush. Hard food and careful brushing may remove every vestige of tartar from the exposed portions of the teeth without being able to prevent the formation of a ring of calculus beneath the shelter of a gum margin that may have been congested from one of many causes.

In some cases of pyorrhœa alveolaris there has been no tartar whatever found on the roots of teeth extracted, but unfortunately this is not a final argument, for it may be legitimately urged that a thin layer of tartar might have been present originally, but was dissolved away by the vitiated secretions of the mouth, which had undergone a change in character and chemical reaction.

The presence of salivary calculus is insufficient in itself to account for a special disease with features of constitutional origin, and there is ample reason for seeking the cause of pyorrhœa alveolaris in a systemic condition. It is known to occur in the mouths of patients whose health has been undermined by debilitating influences and injudicious habits of living. Frequently the disease is seen to attack the opposite sides of the mouth in a symmetrical manner. This is opposed to the assumption of a local origin of the affection. Cases have followed the prolonged use of mercury, iodide of potassium, or chloride of sodium, though it is open to doubt how far the blame should rest on the complaints for which these drugs were taken. Pyorrhœa alveolaris is a common sequel of malarial fever in America, and these patients are said to experience a great craving for salt.

Young patients recovering from eruptive fevers are sometimes subjects of pyorrhœa alveolaris. Frequent pregnancies are a ripe source of the disorder.

The recent researches of Dr. Bland Sutton in Comparative Dental Pathology have supplied us with invaluable data. He established the fact that animals kept in captivity suffered from premature loss of teeth. Mr. Sutton collected numerous specimens of recession of the alveolar process, both when tartar was present and when it was not. At a meeting of the Pathological Society he showed a considerable series of the skulls of monkeys whose jaws were affected with recession of alveolus as a result of rachitis, and he recorded a similar condition occurring in a case of mollities ossium. During the time I was Dental Surgeon to Evelina Hospital, and since, I have seen many cases of premature loss of teeth from recession of alveolar process and gum in rachitic children. Mr. Bland Sutton showed that, in the case of lions kept in captivity, unsuitable food, by preventing the assimilation of lime salts, produced cleft palate in the progeny. Also, that a series of pregnancies at short intervals in the case of a female dog led to similar defects in the osseous system of the offspring by exhausting the maternal store of lime salts. Also, that in a snake kept in captivity the bone of attachment becomes absorbed, leading to the loss of the teeth, which were abnormal in size, number and attachment. The consideration of the above three facts in connection with one another offer a striking parallel to the hereditary form of pyorrhœa alveolaris, and suggest that an element of the complaint might be hereditary defects in the structure of the teeth and alveolar process.

Here one may cite the experience of all dentists that the removal of affected teeth usually cures the lesion where the teeth have stood, and that the disease has a tendency to spread from affected teeth to those in their neighbourhood.

Attention has recently been drawn to *tabes dorsalis* in connection with the premature shedding of teeth. I

recently examined two cases of advanced *tabes dorsalis* in the wards of Guy's Hospital. The disease was well marked and neither patient had ever used a tooth-brush, but there was no evidence of *pyorrhœa alveolaris*. All wasting diseases and depressed conditions of the nervous system are conducive to the premature shedding of teeth, but *pyorrhœa alveolaris* is not a necessary concomitant of advanced *tabes dorsalis*. My friend Dr. Hale White is present to-night, and I leave this phase of the subject in his able hands.

Whilst a depressed condition of the constitutional strength is the most important factor in determining the diseased *pyorrhœa alveolaris*, local causes favour its development, and in patients of this systemic tendency the outset of the attack may be traceable to some slight influence, such as the use of a very hard tooth-brush, coarse tooth-powder, or the like. A crowded arrangement of the teeth may occasion it, or one tooth may be so placed that the mucous membrane around it escapes healthy friction and becomes the seat of the mischief. No doubt the subsequent deposit of tartar on the denuded portion of the root aids as a foreign body in keeping up the irritation of the periosteum.

One gathers from the somewhat diffuse literature of this subject a consensus of opinion that the early stage of *pyorrhœa alveolaris* is characterized by an hypertrophied condition of the muco-periosteal fold around the teeth, accompanied by dilatation of capillary loops, enlargement of papillæ, and rapid proliferation of epithelial cells. Later on the gum becomes firm and contracted, and displays increase of fibrous tissue. What changes go on in the socket during the recession of the alveolar margin I am unable to state, for the simple reason that I cannot get a recent specimen. The theory seems to be wide-spread that the inflamed periosteum becomes separated from the subjacent alveolar margin, thus depriving it of its vascular supply, and leaving it denuded, rough and carious. This



may be so in some cases, but there are many in which the alveolar margin recedes and yet the result of probing is opposed to the supposition that the bone is bare. In these instances the socket wastes without becoming denuded of its periosteum.

At the Medical Congress in 1881, Dr. Walker opened a discussion on Riggs' disease and exhibited a number of microscopic specimens, the conclusions he arrived at being that in the present state of pathological knowledge no distinction could be traced between the loss of a tooth socket prematurely by disease, its absorption after extraction or its wastings in old age, the microscopic characters being identical, viz.:—loss of vascularity, increase of fibrous tissue, subacute inflammation passing into the depths of the alveolar processes adjacent to the inflamed gum. The report does not mention to what extent this hypothesis was accepted, and the microscopic appearances described are unsatisfactory in this respect, that the section that would represent pyorrhœa alveolaris was taken from the mouth of an aged dog whose teeth were loosening.

The Museum of the Odontological Society possesses specimens presented by Mr. Bland Sutton of the skulls of animals which died in captivity, and whose jaws show evidence of a disease which seems to be an analogue of pyorrhœa alveolaris in the human subject. One of these, the skull of a carnivore, is very striking. There is not an even recession of the bone from the margin towards the apex, but the alveolus is obviously attacked to some distance from the margin. Where teeth have recently been lost, the surface of the bone shows depressions and hollows, irregular in outline, with eroded patches and a few spicules of bone that are apparently of new formation. Where the destructive process is at its full activity around a tooth that is being lost, a wide space is noticed to have formed between the tooth and the jaw, by absorption of the bone and the roots of the tooth. The space between the tooth and the jaw is as great at the apex of the root as

at the neck. Around the affected tooth the alveolus is lost on the buccal surface, and wherever the root is laid bare it is coated with greenish-brown tartar, but the destructive process is seen to be going on in places where no tartar is present. There is a very peculiar appearance about the alveolar septum between the roots of the teeth, at those parts where it is thickest and most vascular. Here one can trace the outline of what its shape has been, but the bone has been reduced to a condition suggestive of filligree or trellis work, and the last support of the loosening tooth is obviously pedicles of alveolar process with efflorescent extremities of sponge-like bone. The cementum on the root of the teeth is thinned, and the root itself is greatly truncated by absorption. The general impression remaining is that one is examining a case of osteitis extending from the margin of the alveolar process to a point some little distance beyond the level of the roots of the teeth, and by no means going hand in hand with the deposit of tartar.

The result of local treatment aids us by demonstrating the very refractory nature of well-marked cases. The thorough removal of any tartar from the roots of affected teeth by means of instruments and chemical reagents, and the subsequent use of astringents, gives good results, at least temporarily, by allowing the gum to more closely embrace the roots of the teeth, and preventing the accumulation of tartar and discharge in the alveolar pockets; but relapses are common, and our main attention must be directed to general constitutional treatment, which comes within the domain of the physician.

The inferences that follow from the points I have enumerated lead to the assumption that the affection which to-night we are calling *pyorrhœa alveolaris* is essentially of constitutional origin. In man and in lower animals it is found connected with wasting diseases and depressed conditions of the system. The local exciting cause may be of a very trivial nature.

The weight of evidence tends to place *pyorrhœa alveo-*

laris in the category of bone diseases. The exposed position of the alveolar margin and its intimate relation with organs of such feeble vascularity as the teeth, go far to explain why it is this portion of the alveolus that is first affected, and also the usual arrest of the disease by the removal of the teeth.

#### RECENT RESEARCHES ON SYMPTOMATIC ALVEOLAR ARTHRITIS.

BY DR. E. MAGITOT.

Having referred to the history of and the literature on the disease, the writer says these lesions consist, in fact, of a derangement of an inflammatory nature, affecting at the same time the tissue which has been called the *alveolodental periosteum*, and the bony covering which is subjacent to it, viz., the cement. The term osteoperiostitis was thus justified by the simultaneous lesion of a periosteal and osseous layer. The expression conformed, moreover, to the rule adopted in France on the subject of medical nosology, which gives to every disease a name corresponding to the anatomical lesions which characterize it.

Be that as it may, this last description does not appear to have satisfied all authors, for several of them have gone back to the term *expulsive gingivitis*, which is evidently incorrect, since the gum is never primarily attacked. Others, again, have taken up the term *alveolar pyorrhœa*, which term seems to prevail amongst English practitioners, and particularly with our colleague, Mr. F. Newland Pedley; whilst others, Dr. David, of Paris, for example, propose to call it Fauchard's disease (*Maladie de Fauchard*), after the name of the author, who was one of the first to mention it as described. Following the same idea it is called in England and America Riggs' disease.

If this tendency to multiply without any definite rule the names of the same disease be persevered in much longer, one calling it from one of its symptoms, *pyorrhœa* or *suppuration*, others giving to it the name of an author who has described it with more or less exactitude, extreme confusion will be the result.

Moreover, amongst this diversity of titles the rule, referred to above, of invariably taking as the basis of nomenclature the pathological anatomy of disease, is completely forgotten.

Thus, while regretting to add in our turn a new name to a nomenclature already so long, we feel ourselves nevertheless, obliged to substitute once more for the designation hitherto employed a title which, faithfully conforming to the precise rules indicated, will establish the nature of the disease with all the exactitude desirable. This title is that of *Symptomatic Alveolar Arthritis*.

The justification of this choice is very simple. The recent researches made in France, particularly those by Mons. Malosse, have clearly established the fact that that which we have described as *periosteum* around the roots of the teeth ought to be considered, not as a membrane, distinct and capable of being dissected off, like the osseous periosteum, but rather as a true ligament.

This manner of looking at it, already indicated by Kolliker in Germany, and by Ranvier in France, in his course of lectures at the College of France, is generally adopted in our country. We, ourselves, are in complete harmony with it, thus accepting the necessity of modifying in our own studies the interpretation which we had, until now, assigned to this part of the dental organ.

The teeth are then in reality articulated with the jaws by the intermediary of a *ligament*, and every lesion of such an articulation ought to be assigned to the category of *arthritides*. We shall, then, henceforth thus describe the affection with which we are dealing.

As to the term *symptomatic*, we are induced to avail ourselves of it for the reason that this form of disease ought to be carefully distinguished from the affection hitherto described under the name of *alveolodental periostitis*, and to which henceforth the name *simple alveolar arthritis* will be most applicable. This latter, which is in fact sometimes spontaneous or traumatic, but more often the result of the

last stages of caries, possesses a character and progress quite distinct from *symptomatic alveolar arthritis*. While the last commences at the neck of the root, the former appears only at the apex. Moreover, the loosening and displacement of the teeth, the initial phenomena in the symptomatic form, are very rarely met with in the simple form. Finally, suppuration of the alveoli does not exist in the latter. Let us add that the word *symptomatic* well expresses the relation which this arthritis holds with regard to the general diseases or diatheses which are invariably the first cause of it. These different specific terms indicate clearly the differential signs of the two affections, which can thus preserve the generic denomination of arthritis, the term *symptomatic* sufficing, in our opinion, to distinguish that with which we are occupied in this work from that of *simple alveolar arthritis*, which name should remain attached to the ordinary form.

As we have already indicated in our previous researches, the causes of this disease should be looked for, not in the local conditions of the mouth or gums, but in certain conditions of the general health. The disease ordinarily attacks a single tooth; occasionally several teeth may become involved, but in the latter case the affected teeth are not necessarily contiguous, they may occupy different positions in the mouth at a distance from each other. Toirac and M. Oudet believe they have observed that the inferior incisors were more particularly the seat. We have not ourselves recognized this peculiarity, which appears to us to belong more especially to gingivitis, which may in certain cases be confounded with symptomatic alveolar arthritis.

The teeth most frequently affected are in order of sequence : firstly, the molars, then the inferior incisors, the bicuspid, the superior incisors, and lastly the canines. We have never observed this disease affecting simultaneously the whole of the teeth. At one time it is situated on one or two inferior or superior incisors, at another the incisors

are spared, and one or more molars are affected, ordinarily two or three on different sides of the mouth. Sometimes the disease only attacks a single root of these latter, or it may be only a single side of a root, a circumstance which preserves to the root a certain degree of solidity for a considerable time. The teeth affected with symptomatic alveolar arthritis do not generally present any preceding or accompanying alteration. Caries, for instance, has no connection with this disease, and if this complication is present it is simply an accidental occurrence. It is, indeed, worthy of remark that the local conditions which accompany the development of symptomatic alveolar arthritis appear to be just the opposite to those which accompany the production of caries; the buccal saliva is in fact rather alkaline than acid, an accumulation of tartar more or less abundant is observed in the places where it is usually met with. One might be tempted on the first glance to attribute to this deposit a part more or less active in the etiology of this disease, but it is not so. The deposit of tartar is a secondary matter, and in all cases, its formation being generally uniform and continuous in the same region, it cannot be cited in the production of an isolated and local affection.

It is very important to note the various conditions presented by those who are the subjects of symptomatic alveolar arthritis. The age at which this affection is generally observed is not either in youth or in advanced age, but between the thirtieth and fiftieth year of age; it is equally frequent amongst men and women, and amongst the latter it appears often accompanied with the complex phenomena of the "menopause." In a certain number of cases symptomatic alveolar arthritis supervenes during a state of perfect health, and whatever pains we may take to find out the cause, we cannot recognise it either in the local conditions of the mouth, or in any disorder of the economy; nevertheless, the temperaments which appear predisposed to it are almost exclusively of the sanguine and bilious varieties; constitutions appearing in other respects vigorous, yet

subject to cephalic congestion. Persons of sedentary occupations, those who are engaged in an office, are particularly predisposed to it. We have already mentioned several times the relationship produced by the appearance of the crisis attending the cessation of the menstrual discharge, or of the hæmorrhoidal flux. This influence of temperament has again a close connection with heredity, which in certain families has appeared to us to influence the appearance of the disease; thus it has made its appearance in members of the same family during two or three generations, and in analogous conditions of age and constitution.

Certain intestinal phenomena are observed, whether they be coincidences or whether of etiological connection. Habitual constipation is met with in the subjects attacked, and one of the physicians to the Paris hospitals, M. Fidal, has observed that they often present dyspeptic phenomena. Perhaps these latter may have been due to difficulties in mastication; in any case, we have personally had the opportunity of verifying this assertion. Some general or diathetic conditions exercise a considerable effect on the production of this disease. Thus eruptive fevers have, as is known, sometimes caused a falling out of the teeth, a result produced by symptomatic alveolar arthritis.

We recently observed in a little girl seven and a-half years old alveolar arthritis following a severe attack of whooping cough. The temporary teeth, and above all the permanent teeth already erupted, were surrounded by pads of inflamed gum, with alveolar suppuration and loosening of the teeth (one out of the first permanent molars had already fallen out, and another was greatly threatened.) The affection appeared to consist in an ulcerative stomatitis and a simultaneous symptomatic alveolar arthritis.

Gouty and rheumatic subjects often present this kind of arthritis, as also do individuals attacked with anæmia caused by long illness; but there are no general lesions which exercise a graver influence on the production of this

disease than those of albuminuria and, above all, diabetes. As regards the first we are dealing here, as is well understood, not with symptomatic albuminuria, but with what is properly called Bright's disease.

In glucosuria this phenomenon is absolutely constant, and even constitutes one of the primordial signs of the morbid conditions. In fact it is mostly found in the descriptions of authors that at the commencement of diabetes the teeth become loose and carious. This assertion concerning caries is not correct, but the first is perfectly so, and corresponds to the symptomatic alveolar arthritis which follows in its development the same course and the same progression as the general disease, causing at its termination the loss of a considerable number or the whole of the teeth. Such are the results of our researches, which we communicated to the Academy of Medicine, under the name of "A Treatise on the Value of Diagnosis in Saccharine Diabetes of Alveolodental Osteoperiostitis."

We have not recognized in any way that any other conditions of the health were in connection with symptomatic alveolar arthritis. Thus certain diathesis, such as syphilis, in which the tertiary symptoms affect the bones and fibrous tissues; do not appear to produce it; mercurialization and gingivitis, however great its severity, do not appear to become either the principal or even the occasional cause.

We do not wish here to enter fully into all the considerations concerning the treatment of symptomatic alveolar arthritis. We have detailed them to a considerable extent in our previous publications, but we should like to particularly insist on the value of the action of a certain class of remedies which enter into antiseptic medicine,

We are in fact confronted with a septic and contagious disease, of which the essential symptoms are an abundant alveolar suppuration, loosening and displacement of the teeth, recession of the gums—in a word, all the conditions suitable to make of this lesion a spot favourable for the action of septic agents.



These agents undoubtedly exist in this disease. The microscopic preparations of pus proceeding from alveolar diseases have betrayed the existence of a large number of organisms of very diverse forms, amongst which it is, if the truth be spoken, still difficult to distinguish the variety which ought to be regarded as the essential and exclusive morbid agent of this disease. Further researches, we are convinced, will enable us to realize the culture of the pathogenic agent peculiar to symptomatic alveolar arthritis.

Some interesting experiments, undertaken by MM. Malassez and Galippe, for this purpose have already put beyond doubt the parasitic nature of this disease, and it is also confirmed by the frequent propagation of the disease from one alveolus to another in the same mouth, as well as by contagion from one individual to another, as observed by different authors and ourselves. All that we now wish to insist upon is the value of antiseptics in the treatment of this disease. With this view we would recommend such applications as alcohol, carbolic acid, per-chloride of mercury, &c. For this purpose we have selected the following formulæ:—

No. 1—Hydr. perchlor.....	50 c g.
Aq. Distil.....	1,000 grms.
No. 2—Acid carbolic crystal.....	—
Ether.....	aa 5 "
Alcohol.....	10 "
No. 3—Acid borac.....	10 "
Aq. Distil.....	500 "
Alcohol.....	50 "

To these formulæ we could have very well added others by employing other antiseptics, such as the permanganates, salicylates, salicylic acid, &c. It will be necessary besides to have recourse to the employment of medicines which will modify the local condition, as well as to attend to the treatment of the general health, paying due regard to the diatheses which influence the disease.

Thus the treatment of symptomatic alveolar arthritis can be summed up in the three following paragraphs:—

1st. To render antiseptic the alveolus, the seat of the arthritis.

2nd. To modify the condition of the affected tissues by the application of astringents and caustics.

3rd. To treat the general conditions or diatheses which govern the local manifestations.

Concerning the second point—that is to say, the local treatment of the affected tissues—it is known that we have advocated applications of chromic acid, employed chemically pure and monohydrate, as a powerful caustic susceptible of acting on the vitality of the tissues of the gum, and above all, on the dental ligament. Let us add that chromic acid may also be considered at least equal as an antiseptic to any of the drugs usually employed in that sense. We can mention again, among the modifying agents, pure carbolic acid, chloride of zinc, and lastly heat applied by means of the galvanic cautery.

Finally, as concerns the diatheses, the dominating influence of which we have already referred to, we shall not here indicate the treatment so as not to exceed the limits of this paper.

From the preceding considerations we believe we may deduce the following conclusions:—

1st. The affection characterized by alveolar suppuration, by the loosening and falling of the teeth, ought to be considered as a true symptomatic alveolar arthritis, septic and contagious, and which ought henceforth to remain known by that name in surgical nosography.

2nd. This affection is most often met with under the influence of certain general conditions and diatheses, and as secondary to eruptive fevers, &c., of which it may form either a complication or a sequela.

3rd. The therapeutics of symptomatic alveolar arthritis ought to consist essentially in the employment of antiseptics, of local alteratives, astringents, or caustics, without prejudice to the treatment of the general conditions which are its determining causes.

## DISCUSSION.

The President remarked that the term "arthritis," used by Dr. Magitot, would probably sound strange to most of those present, though it did not really mean anything very different from what they were accustomed to. It was based on the opinion, held by the author of the paper and others, that what was generally known in England as "the alveo-dental membrane" was, properly speaking, a ligament, and that inflammation of it should not, therefore, be referred to as *periostitis*, but as *arthritis*. This view of the nature of the alveolo-dental membrane was founded, in part, on Comparative Anatomy.

Dr. Hale White said he had been interested for some time past on the subject under discussion, having had his attention called to it by the premature loss of the teeth which occurred in cases of *tabes dorsalis*. He showed a tooth which had fallen from the mouth of a patient affected with this disease. It was a lower molar; there was a little tartar on it, but its loss had been unaccompanied by any signs of inflammation. This falling of the teeth was, according to some authors, a rare but genuine symptom of *tabes dorsalis*, and there were apparently two ways in which it could occur. The soft structures around the jaw might swell, and one by one the teeth might fall out, although themselves quite sound; this might be followed by some necrosis of the jaw with discharge of a sequestrum. Or the teeth might fall out without any apparent cause, and the patient might lose a number of sound teeth within a few days without any pain or swelling of the gums. Richardieu has recorded one example of the first kind, whilst examples of the second had been recorded by Hoffman, Lewis, Vallin, Demange, Gowers and Fere. In many of the cases it was an early symptom, but still it was a rare one; indeed, it was a question on which the dentist might be able to give the general physician some information, whether the teeth fell out more commonly in persons suffering from *tabes dorsalis* than in persons not so affected. He (Dr. White)

was inclined to think that the teeth might fall out in many diseases, and that such an occurrence should not be exalted to the position of a symptom peculiar to *tabes dorsalis*.

Dr. White next referred to the atrophy of the lower jaw, described by Fere, as sometimes accompanying *tabes dorsalis*, and inquired whether dentists had met with such a condition of jaw. Disease of the tempero-maxillary articulation had also been described and regarded as significant of this disease, but it seemed probable that this also was only a coincidence, and that it was really caused by rheumatoid arthritis.

He should, further, be glad to know whether any examples of inco-ordination of the muscles of mastication had ever been observed by any of the members, and was the use of the "jaw jerk" of any advantage?

In trying to trace the cause and effect in these cases, it must be remembered that any wasting disease would affect the teeth also, whilst on the other hand any difficulty in mastication would lead to impaired nutrition.

Mr. J. Bland Sutton, in reply to an invitation from the President, said he had come to learn and not to speak. He could only endorse the views which Mr. Pedley had expressed in his paper. The disease was undoubtedly chiefly of constitutional origin, but it also required local treatment; and as the physician did not consider that the teeth were in his province, and the dentist thought the constitution was not in his, the treatment of this disease fell between two stools. He had examined a large number of cases of rheumatoid arthritis, and found that the premature loss of the teeth was a very common feature. It was also met with in *mollities ossium* and in other wasting diseases. As to *tabes dorsalis*, it was, he believed, only a name for a group of symptoms not connected with any definite pathology. It was, however, a curious fact that some of the carnivora got symptoms closely resembling those of the locomotor ataxy in the human subject, including the falling out of the teeth and absorption of the alveoli.

To arrive at a proper understanding of Riggs' disease it was necessary not only to look in the patient's mouth, but also to note carefully the constitutional state, and especially any indications of the presence of rheumatoid arthritis, and to obtain particulars of the patient's family history. It was only by the careful collection of facts that it could be ascertained whether Riggs' disease was really a disease, or whether the name was merely a convenient cloak for ignorance.

Mr. F. J. Bennett said Mr. Pedley appeared to consider the vascular supply to the periosteum was derived principally from the vessels of the pulp and of the alveolus. But it was a fact which could be clearly seen from specimens in the Museum that there was a very free supply from the submucous tissue of the gum. The capillary network where the gum joined the neck of the tooth was very peculiar from the looped arrangement of its vessels, a description and illustration of which was given in Salter's "Dental Pathology," and in Tomes' "Dental Surgery" there was a figure of an injected specimen showing the vessels much enlarged in a monkey.

Tracing the course of the disease, it would be found that the first symptom was increased vascularity at the gingival margin and separation of the gum from the neck of the tooth; that there was a strong tendency for this part to become congested, and that this congestion was followed by effusion into the submucous tissue, causing gradual destruction of the fibrous attachment of the periosteum of the tooth.

The belief in the dependence of Riggs' disease upon tartar appeared to be still very general, but a strong argument against this was that cases were frequently met with in which persons had large accumulations of tartar which had been forming for years, but yet had not caused separation of the gum from the tooth. This, he thought, was quite sufficient to show that there was no necessary connection between the presence of tartar and Riggs' disease.

He agreed with Mr. Pedley that the disease was pre-disposed to by causes which brought about a lowered state of constitution, as anæmia, dysentery, frequent pregnancies, feeble circulation, &c.

Mr. S. J. Hutchinson said he wished to say a word in defence of the name by which the disease which was the subject of discussion had been generally known for some years past. He was quite aware that Dr. Riggs was not the first to recognize the disease, but that the symptoms were accurately described in the first edition of Tomes' "Dental Surgery." But Dr. Riggs was the first to point out that the removal of the free edge of the alveolus had the effect of checking to a considerable extent the progress of the disease. He had in fact pointed out the only method of treatment which had hitherto proved successful, and he (Mr. Hutchinson) thought that the connection of Dr. Riggs' name with the disease was not an undeserved compliment. It must be admitted that the profession was still in darkness as to the origin of the disease, and further investigations into its etiology and pathology were greatly needed.

Dr. Walker said he should be pleased to present to the Society the sections (eighteen in number) which had been prepared for examination by the members of the International Medical Congress of 1881 by Dr. Gibbes, and to which Mr. Pedley had referred in the course of his paper. The members could then examine them at their leisure, and form their own opinions respecting them.

Mr. Moore said it had been stated that evening that Riggs' disease never affected all the teeth. With reference to this point he would mention the case of a lady, aged thirty, whom he had treated for this disease about fifteen years ago. All her teeth were loose, and covered with hard nodular tartar, from the crown to the apex of the root. Various remedial measures were tried, but proved useless, and eventually all her teeth had to be extracted.

The President said that some years ago, when on a visit to the States, he saw Dr. Riggs carry out his treatment

in a good many cases. He did not remove the edge of the alveolus, for this was already gone before the cases came under treatment, but he gouged out and scraped away all the softened bone surrounding the affected teeth. His treatment was somewhat severe, but its *immediate* effects were certainly very good. In all the cases, however, which he (Mr. Tomes) had been able to trace out afterwards, the disease had recurred and run its usual course.

The question with reference to the connection of tartar with the disease, which had been referred to by several speakers during the discussion, received, he thought, some elucidation from a specimen in the Museum. On looking at this it would be seen that the ring of hard tartar surrounded the tooth at some distance from the edge of the alveolus, and that the surface of the tooth between these points was quite clean. It seemed evident from this that the tartar could not be the cause of the absorption of the bone.

With reference to what had been said about the premature loss of teeth by patients suffering from locomotor ataxy, he could only say that in two cases of this disease which had come under his notice the teeth were in a perfectly healthy state. In both cases the disease was at a comparatively early stage.

Mr. Heth said the majority of those who had taken part in the discussion appeared to agree in considering that Riggs' disease was of constitutional origin, and he thought hardly enough attention had been paid to its local causes. It appeared to him that a good deal might be said in opposition to the theory of its being a constitutional disease. In the first place many of those who suffered from pyorrhœa alveolaris were in what might be termed vulgar good health. Then it was not unusual to find a single tooth affected in the upper or lower jaw, and sometimes only a single root, as the palatine root of an upper molar, the other being healthy. The way in which the disease spread on either side of an infected centre was much more sug-

gestive of a local than of a general origin. The effect of local remedies also served to strengthen this view, and the fact that the disease could not be checked, if not cured, by antiseptics. He thought that the difficulty in effecting a permanent cure arose from the fact that sufficient attention was not paid to the disease in its early stages.

Dr. Field said he could not elucidate the pathology of the disease, but he should be glad if he might be allowed to say a few words with regard to some practical points in connection with it. He would repeat what he had stated before the Society not long since, that cases of genuine Riggs' disease were comparatively rare, and he doubted if one had ever been cured. He knew that Dr. Riggs and others asserted that they had cured cases, but he himself had never yet seen a patient permanently cured. The disease was invariably connected with a depressed state of the nervous system. In several of the cases he had seen the patient was suffering from Bright's disease, and one was suffering from locomotor ataxy. Medical and dental treatment must go hand in hand. Locally he still used Dr. Riggs' instruments, carefully removing all tartar and then applying aromatic sulphuric acid. The gums should at the same time be stimulated by rubbing and by massage with the fingers. By these means good results could be obtained for the time, and the progress of the disease checked, but he almost despaired of obtaining a permanent cure.

Dr. Geo. Cunningham thought that if Dr. Field would make further inquiries he might be induced to modify his opinions. It was Dr. Mills, of Brooklyn, who was chiefly instrumental in getting Dr. Riggs' name attached to the disease. He himself suffered from it, and was cured by Dr. Riggs. Dr. Riggs was a very modest man, and no reflections could be thrown upon him for the use which had been made of his name.

It was certainly very desirable that more exact knowledge should be obtained with reference to the pathology



of this disease, and he would suggest that if dental students would examine the mouths of all the cases brought to the *post-mortem* room they would be sure to come upon examples of Riggs' disease, and might obtain sections which would be far more reliable than any which could be got from animals.

Mr. Storer Bennett said he should like to call the attention of members to the fact that there were a number of very interesting specimens of premature absorption of the alveoli to be seen in the Museum, and he thought that if members would take the trouble to investigate them carefully, they might add a good deal to their knowledge of the subject.

Mr. Pedley, in reply, said he could not agree with Dr. Magitot in thinking that the disease was contagious. He had never heard of a dentist getting it from a patient, and as to its spreading to contagious teeth, it spread, not by contagion, but by continuity of tissue. As to the germ theory, this had been frequently suggested, but never proved. No doubt there was an abundance of germs present, but it could not be proved that any of these were specific. In the discussion which took place on this subject at the International Medical Congress of 1881, Dr. Arkovy announced that he had discovered and cultivated some organisms which he thought were peculiar to this disease, but these observations had never been confirmed, and Dr. Arkovy himself did not appear to have thrown any further light on the subject.

Dr. Magitot also denied that syphilis or mercurial treatment predisposed to pyorrhœa alveolaris. He (Mr. Pedley) could only say that this did not accord with his experience.

So far as his limited experience enabled him to judge, he thought Dr. Hale White was right in concluding that there was no direct connection between Riggs' disease and tabes dorsalis. Certainly in the cases of this disease which he had examined at Guy's Hospital the gums were quite healthy.

He was not surprised to hear from Mr. Sutton that patients who suffered from osteo-arthritis were liable to suffer also from pyorrhœa alveolaris; it only confirmed his experience that it was a frequent complication of all chronic diseases resulting from constitutional debility.

Mr. F. J. Bennett supported the "catarrhal theory." Some cases of congested gum margin might be explained in the way he had suggested, but his theory certainly would not account for the course and symptoms of pyorrhœa alveolaris.

Dr. Walker had kindly offered to present his series of specimens to the Society. He (Mr. Pedley) readily admitted that several of these were valuable and instructive but he objected to the sections taken from the jaw of an old dog which was losing its teeth being regarded as typical of Riggs' disease.

He could not quite understand the grounds on which Mr. Hutchinson advocated the retention of the name "Riggs' disease." He gathered that Mr. Hutchinson wished to retain it because it commemorated a method of treatment which was based on a theory which was now known to be incorrect, and which had itself proved unsatisfactory in practice.

He congratulated Dr. Field on having changed his opinions since 1877, and come round to what he believed to be a truer view of the case.

Dr. Cunningham had alluded to what he said was "a genuine case of Riggs' disease," but as there was no definition of Riggs' disease to be obtained, it was impossible to say exactly what was meant by "a genuine case." Dr. Riggs attributed the disease to the effects of tartar, and his treatment was intended to effect its removal. There was no doubt that the treatment did do good for a time, but only by the removal of *debris*, and to deal thus roughly with diseased bone, breaking and lacerating it with instruments, appeared to him on the face of it an unwise course to pursue.

Mr. Tomes had referred to a specimen in the Museum, which showed clearly that tartar was not to be found where the destruction of bone was going on most actively. He (Mr. Pedley) had alluded to this in his paper, and he had no doubt had the same specimen in mind.

Mr. Hern appeared to think that a ring of hard dark tartar was the distinguishing characteristic of Riggs' disease. What then would he call the cases in which there was no tartar to be found, but which were identical in every other respect?

After the usual votes of thanks to the contributors of casual communications and the authors of the papers read during the evening, the Society adjourned.—*London Dental Record*.

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#### ARTICLE II.

### ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

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The Annual General Meeting of the Society was held in Edinburgh, on March 11th, the President (Mr. W. Bowman Macleod, L. D. S. Edin.) in the chair.

The Treasurer (Mr. M. Macgregor) submitted his report, which showed an income of £49 9s. 10d., derived from subscriptions, entry money, and interest on bank account. This, with a balance carried forward from the previous year, and a deposit receipt of £95, gave a total of £146 10s. 10½d. After deduction of expenses, which included printing, rent of rooms, stationery, &c., a sum of £112 7s. 0½d. was left as representing the funds of the Society—an increase of £15 6s. over the corresponding amount of the previous year.

The Curator and Librarian (Mr. G. W. Watson), in tendering his report, said he had great pleasure in an-

nouncing that Mr. Robert Hepburn, of London, had very generously presented to the Museum the large collection which had been on loan from him for a considerable time past in the Society's Museum, and which included cases containing a series of mineral teeth, with the maker's name attached, from 1815 to 1863; also gum-work blocks of moulds for teeth, old-fashioned instruments, &c.

On the motion of the President, the meeting recorded its sense of gratitude to Mr. Hepburn for his handsome donation, especially as many of the objects included were unique, and there were many others, duplicates of which were only to be met with in similiar Museums.

The following members were elected office-bearers for the forthcoming session, 1887-8:—*President*—W. H. Williamson, M. B., C. M., L. D. S. Edin., D. D. S. *Vice-Presidents*—Malcolm Macgregor, L. D. S. Edin.; J. Moore Lipscomb, L. D. S. Eng. *Hon. Treasurer*—G. W. Watson, L. D. S. Edin. *Curator and Librarian*—J. Stewart Durward, L. D. S. Edin. *Hon. Sec.*—John S. Amooore, L. D. S. Eng. *Councillors*—James Mackintosh; W. Bowman Macleod, L. D. S. Edin.; Walter Campbell, L. D. S. Eng.; Rees Price, L. D. S. Eng.

Mr. Andrew Wilson, L. D. S. Edin., read a paper, entitled—

#### THE PREMOLARS IN MAN.

The premolars in man are normally two pair in each jaw, and as they have two cusps, more or less decided, they are more frequently called bicuspid.

The latter name is, however, far from definite, as we occasionally, although rarely, have bicuspid central and lateral incisors, and also bicuspid canines, the extra cusp in these being due to an enormous development of the tubercle or prominence in the centre of the cingulum. The forms of the premolars in the upper jaw differ very considerably from those in the lower, and while in the latter the distinction between the first and second is decided, there is little comparatively between the two upper. There

being, so far as I am aware, no description of the upper premolars in any of the dental or anatomical works in our language \* sufficiently accurate as to enable one to distinguish even the teeth of the two sides, I will, with your permission, begin by endeavoring to give one, taking the first premolars as that best marked. As in all teeth having a grinding surface, we have in the human premolars five surfaces, namely: labial, lingual, mesial, distal, and grinding.

The labial surface is broadest between the mesial and distal angles of its grinding margin; it tapers somewhat abruptly towards the neck, and is convex longitudinally and still more so transversely. The length from the neck to the mesial angle is much less than that to the distal, and it tapers very abruptly from these angles to the apex of the labial cusp, which is placed decidedly to the *distal* side of the tooth, the slope from the apex to the mesial angle being thus much longer and greater than that to the distal angle.

A well-marked ridge passes upwards from the apex and merges in the general surface about half-way up; so leaving two lateral depressions, that toward the mesial angle being the larger and more pronounced; occasionally it is deeply grooved.

The lingual surface may be said to be composed wholly of the cusp and its base. It is shorter than the labial, but is much more convex, both longitudinally and transversely. It terminates in the lingual cusp, the apex of which lies *close to the mesial* side of the tooth.

The mesial surface is at its grinding margin nearly flat, but a little from that it becomes *concave*, the depression being greatest toward the labial margin and neck.

The distal surface is much larger than the mesial; is convex transversely and still more so longitudinally.

The grinding surface is irregularly quadrate, its labial

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\* A small work in German, "Anatomie des menschlichen Gebisses," by E. Muhlreiter, Leipzig, 1870, gives a very detailed and, judging by the engravings, extremely accurate description of the human teeth.

and distal sides being greater than its lingual and mesial respectively. Its centre is occupied by a deep transverse depression, somewhat crescentic in form, the concavity being towards the labial side. From the apex of the labial cusp a well-marked ridge passes upward, ending abruptly in the depression, and occasionally a much fainter one passes from the lingual cusp.

The mesial and distal sides are bounded by a rounded ridge or parapet, continuous with the lingual cusp, that on the mesial side being usually broken by the transverse depression.

The peculiarly irregular form of the grinding surface is best seen if a pair be placed with their mesial sides in contact.

There may be either one, two (labial and lingual), or three (two labial, one lingual, as in the Simiadæ) roots, two being the most frequent, three being comparatively rare. The divisions may occur at any part, and the divergence of the roots may be very decided.

When the root is single, both its mesial and distal surfaces are longitudinally grooved, that on the former being the deeper, and there is not unfrequently a slightly marked one on the labial surface.

The pulp cavity in the crown follows the contour of the tooth, having corona corresponding to the cusps. At the neck the canal is much compressed, especially in the middle, becoming so much so in the grooved root of single rooted teeth as to be practically two canals united by a mere fissure.

The description of the second differs in a few points. In it the labial and lingual surfaces are nearly equal, the former is less V-shaped, the depressions on each side of the labial ridge are almost obsolete, and the root is more frequently single.

Abnormal forms in these teeth seem rare. I have met with one case in which the first on both sides simulated the first lower, in that the lingual cusp was rudi-

mentary, and was connected with the labial by a well-marked ridge, on each side of which was a slight depression. We have also cases in which the first is a geminated tooth (union with a conoid tooth on its mesial side), three of which I show. I have also met with one case in which a second has assumed the conoid form.\*

The second is also very frequently smaller than the first, the difference in some cases being very marked. Both seem to be more liable than other teeth to become more or less rotated during eruption, the second being not unfrequently semi-rotated.

Of the lower premolars we have already very good descriptions; in them, as in all the other teeth (the upper premolars alone excepted), the most prominent point of the convexity of the labial surface is towards the mesial side, to which also the labial cusp points, and their lingual surface is much less convex than the labial, just the reverse of the uppers (this also applies to the molars).

They have almost always single roots, but we occasionally meet with some having two, which are labial and lingual, as in the upper (in the Simiadæ, where two is the normal number, they are mesial and distal, as in the molars). Abnormal forms seem rarer than even in the upper. I have met with the first, a geminated tooth (two firsts), and also cases in which firsts and seconds were very much flattened, the mesio-distal diameter being much the largest.

A form of the second, in which the lingual cusp is divided by a notch into two sub-equal cusps, is extremely common.

The extreme convexity longitudinally of the labial surface in the first (the cusp being almost over the centre of the tooth) is much more strongly marked in the anthropoid apes, and I think can be traced to the very peculiar form seen in the macacques and baboons, in which a large surface is opposed to the formidable upper canine.

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\* Since writing this paper, I have met with another abnormal form. In it there are on the labial surface, besides the ordinary cusp, two others, one on each side, springing from about the middle of the surface.

The premolars present in man are usually given as representing the third and fourth of the typical placental mammalian dentition, but I am much more inclined to regard them as the second and third, for the following reasons:—

In those mammals in which we have the typical number, the first is usually more or less rudimentary in form, and almost, if not quite, invariably has had no deciduous predecessor. It is this tooth which I consider represented in man by the conoid portion of a geminated first.

In the few cases on record of a normally formed supernumerary premolar in the human dental arch, it is to the distal side of the normal second, and in the only case I have met with (lower jaw) that on the one side erupted after the extraction of the first molar, while that on the other side only did so after the removal of both the first and second molars. I am inclined to consider these rudimentary, and almost conoid teeth, which we not unfrequently meet with in the upper jaw, to the buccal side of the normal series. As supernumerary premolars (the fourth typical) we have them between the second premolar and second molar, between the first and second, and even between the second and third. They also occur as conoid teeth geminated with the first molar (on their buccal surface.)

The tendency to dwarfing in the second, and its being occasionally conoid, also point to the same conclusion.

In the platyrrhine monkeys, where three premolars are normally present, the first differs in form from the other two, which are alike, and as they have three molars in their temporary dentition, I regard their successors, the premolars, as the second, third and fourth of the typical dentition.

I may notice, in passing, that the teeth generally in these apes are much more human in form than those in the old world monkeys, the anthropoids excepted.

Those members who take a special interest in this



subject will have remarked that I have made no reference to the extraordinary case recorded (with illustration) in the Association Journal for March, 1886, in which there are six premolars, all well formed, on the one side, the normal number being on the other. My reason for doing so is that there are so many points in which it is abnormal, and so little is known of its history, that I could not venture to draw any deductions from it.

As regards the number, it is just double of any other case I know of on record. Even when we include the lower mammals, very few cases are recorded of five premolars on one side. Owen figures one in an Indian boar,\* another is figured by De Blaineville in one of the long-muzzled canidæ,† and I exhibited another in an Australian dingo to this Society last session; but these are all in species in which four is the normal number, not two, as in man, and the supernumerary is only a duplicature of the first, the most rudimentary of the series, and having a temporary predecessor. In this case none are rudimentary.

As I have already remarked, unfortunately little is known of the history of the case; nothing in reference either to the number and position of the temporary molars or order of eruption of the premolars and first molar.

Supposing there was no excess of temporary molars and that their arrangement was normal, the germs of the two extra premolars, which are *in* the arch, must have been developed and in possession of the space belonging to the first permanent molar at a very early period—a state of matters which would most likely have involved their eruption in advance of the molar. Again, as there was no abnormality in the lower teeth, one would have liked to learn how these articulated with the upper.

The case is stated to have been complicated by cleft palate, but judging from the illustration; one would hardly have thought so.

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\* Odontography, Plate 141, Fig. 3.

† C. Tomes' Manual, 2nd ed., p. 386.

In conclusion, I will only add that I sincerely trust the time is now past when such a case, or any approaching it, will be allowed by any dental surgeon to lie unrecorded for years, as this one was.

## DISCUSSION.

Dr. Smith said that, not previously knowing the drift of Dr. Wilson's paper, he felt some difficulty in complying with the Chairman's request to open the discussion upon this abstruse and interesting subject. It was something new in the literature of dentistry, as in no work he knew of in the English language was there any such admirable description given of the anatomical peculiarities and distinctive characters of the premolars in man. A dissertation upon these teeth was beset with many difficulties. It would be recollected that only one of the four classes of teeth met with in the mammalia was really scientifically defined, and that was the incisors. Shape, number, size, and other matters, which were liable to vary and become grounds of dispute, were not maintained as the main definitions distinguishing the incisors, these teeth being always held to be simply the teeth contained in the intermaxillary bones. In man the bicuspid was described as the surviving representative of the premolar teeth figuring in the archetypal formula of the mammals. But, even in such formula, what precise characters constituted or were essential to a premolar tooth was a difficult matter to determine. They were not in every case the successors of the milk molars, as they were in man. They varied in size, and shape, and number, as well as in having predecessors, or having successors, and even in their presence, to a considerable extent, throughout the animal kingdom. Even the canine tooth itself—the first or anterior of those in the true maxilla—might sometimes be fairly classed among the premolars, as in those cases where all its typical characters were wanting, and were found in some other class of tooth, such as the incisor, and which occurred in various well known instances among the lower animals. These remarks

had suggested themselves on hearing Mr. Wilson's interesting allusions to the variety in certain points of formation and number among these teeth when occurring in various animals, as relating to certain abnormalities in the number of these particular organs, and the multiplication of their fangs occasionally met with in the human subject. Wherever the full number or perfect development of these or other systematic parts throughout any class of animals departed from what appeared to be an established typical formula, it might, according to modern research, be assumed as in all probability due to the influence of what was known as diminished functional activity, or to what was called adaptive modification, leading to survival of the fittest—a natural law exemplified in the case of individual animals where certain structures, whose function had ceased, disappeared; such as in the ductus arteriosus, or thymus gland, after birth; in the atrophy of muscle from disuse; or of the optic nerve, where certain causes have led to blindness. These were all interesting and instructive points suggested by Mr. Wilson's valuable and exhaustive communication. The plaster models, also, which he had exhibited as illustrating his views, were excellent examples of that structural conformation in special and differentiated teeth, such as those of the heterodonts, which had led to the hypothesis that they were derived merely from some fusion of the simpler forms of these organs, as met with in the homodonts. Altogether the paper was one which merited the warmest thanks of the Society.

Mr. Watson described a lower right wisdom tooth of abnormal shape, which had been extracted at the hospital, with considerable difficulty, by one of the students. On the coronal portion of the inner margin of the posterior lingual root arose a somewhat longish oval protuberance, projecting backwards and slightly outwards—constricted at its attachment, but swelling out towards its extremity. It was covered by a thick and highly vascular membrane (enamel membrane), the whole being beneath the surface of

the gum when the tooth was in position in the mouth. At the base of the protuberance, and somewhat between the normal roots, was situated a third small and somewhat flattened root. He had made a section through the abnormal portion, and used part of it for a micro preparation, from which was taken a photomicrograph. On examination after section, the pulp chamber was found to have passed some distance into the protuberance, which, in fact, was analogous to the crown of the tooth. Of the general appearance of the tooth, the members would be able to judge from the remains of the tooth, and also from a model of the tooth in its entirety—and the nature of its histological structure could be better understood by reference to the photo-micrograph. The probable physiological explanation of this malformation was that the germ of a supernumerary tooth had been developed in close approximation to the third molar, with which it eventually coalesced, the small extra root properly belonging to the supernumerary, and the two teeth possessing pulp chambers in common.

Mr. Watson also called attention to the suitability of photomicrographs for teaching purposes, owing to the great improvements in objectives within the last few years, with which most beautiful and satisfactory results could now be obtained. In one of the specimens exhibited—a full-length section of a lower first bicuspid, with an odontome upon the root—it was impossible a few years ago to get a lens to take in more than the crown of the tooth, but now it could be represented in its entirety.

Photo-micrographs of osteo-dentine, dentine of repair, &c., were also shown.

Mr. Macleod made a short communication on the subject of Cunningham's method of facing hard rubber plates with metal. He said the process has for its object the placing between the palatine surface of vulcanite dentures and the mucous membrane of the mouth a layer of gold, which, being a good conductor of heat, will reduce the tendency to inflammatory action which vulcanite is said to

induce. Several attempts have previously been made to line the surface of plates by means of gold leaf, &c., but these have all proved failures, owing to the readiness with which the gold lining scaled from the plate, to say nothing of the difficulty of carving the leaf in a uniform and unbroken surface round isolated teeth and up to the margin of the finished plate. Cunningham's process has none of these defects. Whether it will reduce the liability to congestion or not, it presents an attractive and workmanlike finish, and a surface which is more readily kept clean, and on these two points deserves our present commendation, leaving the more debatable one of avoidance of inflammation to be determined by experience.

Mr. Macleod then illustrated the process on prepared models, and the finished work by specimens made by Mr. Cunningham and himself.

Mr. Wilson said that he could not see how any benefit could be derived from the heat-conducting property of the gold lining, as it was covered on its lingual surface by a thick layer of vulcanite, its only free surface being practically the edge exposed at the palatal margin. The metallic layer might possibly assist in the case being kept clean, but the whole affair had an unpleasant odour of humbug about it. Having had personal experience of a vulcanite surface, both coloured and uncoloured, in contact with the palate for fully five-and-twenty years, he had found no uneasiness which could be traced to its being a non-conductor of heat.

Dr. Smith said he was not quite sure how the conducting power of a metal would be influenced by being coated on one side by vulcanite in a cavity such as the mouth, where the temperature was not always uniform. The metal might act as a conductor of heat in two ways—it might convey heat from the palate, but on taking hot food into the mouth it would act in the opposite manner. This the vulcanite coating might obviate. As for irritation being caused by vulcanite, it no doubt might occur in

exceptional cases, but he had seen very similar irritation. occasioned by gold plates, and long ago by the old fashioned bone sets—in certain patients.

Mr. Brownlie said there can be no question about the improved appearance which Mr. Cunningham's process gives to vulcanite work—converting what is, in its best fitting form, an unpleasant-looking surface into a “thing of beauty.” In his humble opinion its merit ends there, however.

From the notices which have been given of this process, and the statements made in connection with it from time to time, it appears to have been devised to cure, and has been thought to cure, a condition with which every practitioner is more or less familiar, but which is not due to wearing vulcanite. He could recall as many cases of the like condition when gold was worn as when vulcanite was the base. Want of cleanliness explains much of it, but not all. In some cases they must look upon it as a condition peculiar to the individual, aggravated by continuous wear and a close fit.—*London Dental Record*.

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## THE AMERICAN DENTAL ASSOCIATION.

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*Chicago, June 25th, 1887.*

All railroads, west of Chicago, and from Chicago leading to Niagara Falls, will carry members and delegates of the American Dental Association at one and one-third fares.

### READ THE RULES CAREFULLY.

Each delegate must purchase a first class ticket to the place of meeting, for which he will pay the regular fare and upon request ticket agent will issue to him a certificate of such purchase.

If through tickets cannot be procured at the starting point, delegates will purchase to the most convenient point where such through tickets can be obtained and re-purchased through to place of meeting, requesting a certificate from the ticket

agent at the point where the re-purchase is made.

Tickets for the return journey will be sold by the ticket agents at the place of meeting at one third the highest limited fare, only to those holding certificates signed by the ticket agent at point where through ticket to place of meeting was purchased, and countersigned by the Secretary or clerk of the convention, certifying that the holder has been in attendance upon the convention. Tickets are good, going three days before the meeting and returning, three days after its termination.

A. W. HARLAN,

*Chairman Executive Committee.*

P. S.—Equally favorable rates are expected from the South and East.

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## VIRGINIA STATE DENTAL ASSOCIATION.

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### PRESIDENT'S OFFICE.

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*Fredericksburg, Va., April 28, 1887.*

The Eighteenth Annual Session of our State Association will be opened at the Hygeia Hotel, Old Point Comfort, Tuesday, August 29, 1887, at 10 o'clock A. M.

You are cordially invited and urged to be present at what we expect to be the largest and most enthusiastic meeting of our profession ever held in the South.

The Southern Dental Association will meet at the same place, on the 29th, by our invitation, and we desire that every dentist in the State should be present to extend to our guests a genuine Virginia welcome.

The attention of the members of committees is particularly called to Article VI., Sections 2, 3 and 4, of the Constitution, a copy of which will be found herewith. Arrangements will be made for publishing the papers in the *Southern Dental Journal*.

Full particulars and details will be given in future circulars. In the meantime make all your arrangements with a view to being present.

GEO. H. CHEWNING, *President.*

SOUTHERN DENTAL ASSOCIATION.

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The annual session will be held at Old Point Comfort, (Fortress Monroe) Virginia, in the Hygeia Hotel, beginning August 30th.

W. W. H. THACKSTON, M. D., D. D. S., PREST.  
FARMVILLE, VA.

EXECUTIVE COMMITTEE.

DR. J. HALL MOORE, Richmond, Va., Chairman.  
DR. J. R. WOODLEY, Norfolk, Va.  
DR. E. S. CHISHOLM, Tuscaloosa, Ala.

COMMITTEE OF ARRANGEMENTS.

DR. J. R. WOODLEY, Norfolk, Va., Chairman.  
DR. T. S. PARRAMOR, Hampton, Va.  
DR. G. S. F. WRIGHT, Columbia, S. C.

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AMERICAN DENTAL ASSOCIATION.

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CHANGE OF PLACE OF MEETING.

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The twenty-seventh annual meeting of the American Dental Association will be held at Niagara Falls, commencing Tuesday, August 2d, 1887.

GEO. H. CUSHING, *Rec. Secretary.*

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THE NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

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*Orange, N. J., June 21st., 1887,*

The annual meeting of the National Association of Dental Examiners will be held at Niagara Falls on Monday, August 1st, 1887, at 3 P. M.

FRED. A. LEVY, *Secretary.*



## Editorial, Etc.

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A ROMANTIC HISTORY CONNECTED WITH A PROMINENT DENTIST.—The celebrated case of the two dental Parisian-American Evanses which has just ended after twenty years of litigation, during which time Thomas and John Doyle Evans, uncle and nephew, wrestled in the French courts to find what's in a name, is of peculiar interest in Baltimore. It was here that John Evans, the nephew, son of Rodolphe Henri and Elizabeth Evans, first saw and then conquered the affections of his wife, then the handsome Baltimore girl—plain Annie McDonald, now the Marquise Annie Evans d'Oyley. Annie McDonald was the daughter of Alexander McDonald, a printer, who was for some time succeeding 1841 foreman of compositors of the *Sun*. Her mother was the daughter of Thomas Walsh, for years the sexton of the Church of St. Vincent de Paul, on Front street, and also proprietor of a bottling house on South Frederick street. She was baptized in St. Vincent's Church by Rev. Father Myers.

After Mr. McDonald's death Annie and a sister were thrown upon their own resources. Annie, who had been carefully educated in the school attached to St. Vincent's Church, chose to be a governess, and she accepted a position with the family of Mrs. Fitzpatrick, in Montgomery county. It was there that Rev. Edmund Didier, now of St. Vincent's, who was then stationed in Montgomery, became acquainted with Miss McDonald in 1864. Father Didier says the lady, who was a very beautiful brunette, of petite form, was greatly in demand among the society of the place. She was possessed of an exceedingly gentle, generous and religious temperament, coupled with a most lovable and refined disposition, but she was also disposed to be more retiring than the demands upon her presence were willing to concede. In consequence of this she refused many opportunities of appearing in society.

Among her many admirers was Mrs. Elizabeth Evans, mother of John Evans, who kept up an uninterrupted correspondence with her son, who was engaged in dentistry and litigation in Paris. Mrs. Evans persuaded Annie McDonald to take up her residence with her in West Baltimore, and the young lady was adopted as a daughter. Mrs. Evans' glowing description of the graces of her foster daughter were duly sent to her son in France, with urgent appeals that he should come to Baltimore to see his new sister.

John Evans came on in 1870, and met Annie McDonald. It was a true case of love at first sight, and the parties to the romance were wedded shortly afterwards in this city. It was after this marriage that John Evans applied to the Philadelphia Court of Common Pleas to change his name to John d'Oyley a name derived from his middle name, Doyle, when he was made a marquis by Pope Pius IX for his devotion to the church and his celebrity in his chosen profession.

From this circumstance sprang the grounds of the later legal battle between him and his uncle, Thomas Evans, and which has resulted in the French court allowing the younger to practice dentistry under the name of John Evans, and to be known in private life as Marquis d'Oyley. Mrs. John Evans, Marquise d'Oyley, nee Annie McDonald, who left here a purely American girl, with no knowledge of the French language, Father Didier found upon his visits to Paris to be absolutely inured to the French manners of high life, and as fluent in the use of that language as a native. Father Didier says he was overwhelmed with kindness at her beautiful country villa near the French capital, and that he was the recipient of many attentions at the hands of her husband and beautiful children. She presented him with a photograph of herself and three sons in a group, which was countersigned Annie Marquise d'Oyley. Also, a separate portrait of the youngest boy, Alastre Baron d'Oyley, aged 3½ years. After Mr. Didier's return the Marquise, in honor of her baptism at St. Vincent's, sent a very valuable painting of the Crucifixion, which now adorns the altar place of the sanctuary.

# Monthly Summary.

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ELEMENTS.—Physicists have for some time looked doubtingly on the elementary constitution of many of the sixty-five or more substances which are given in text-books on chemistry as elements; and the latest investigations of Mr. Crookes have served to make their right to be named elements still more questionable. To rightly understand the value of his conclusions, we must bear in mind that every metal in its spectrum, has written its autograph by its molecules. The bands of colour are ever there, and in the same position, though sometimes a single band has been separated by finer instruments into two bands, as in the well-known D line, which demonstrates the presence of Sodium. The problem attacked by Mr. Crookes was the metal Yttrium, which has a spectrum, made up of five lines, one of which is double. Using a very dilute solution of Yttrium and an equally dilute solution of ammonia, so that many hours elapsed before even turbidity was produced, after many days a precipitate resulted; this he distinguished as *Ga*. The remaining clear fluid was then treated with a stronger solution of ammonia, and after a considerable time a precipitate, *Gb*, was formed. This process was continued with a stronger and stronger ammonia precipitant until *Gc*, *Gd*, and *Ge* were separately formed, and no further effect could be produced. Each of these precipitates was examined by the spectrum produced with the electric spark, and was found undeniably to correspond to one of the five lines, though not in the order in which they stand in the Yttrium spectrum. Had these precipitates been Yttrium in different conditions, there would have resulted the five-lined spectrum of Yttrium in each case, but as there only resulted one of the five in each case, it is fair to assume that these five substances are the components of the so-called Yttrium. If this assumption be a true one, we may have to unlearn our chemistry and go back to that of those grand old fellows, the

Alchemists, who held that gold only differed from baser metals by containing more of that subtle principle for which they were ever seeking, which Mr. Crookes has named protyle, and which he considers may have been the origin of all matter.—*Dental Record.*

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**ARTIFICIAL TEETH—To Patients.**—The question first to be settled is, Who is to judge what is natural? Certainly not the patient, who has been without teeth for a long time, nor members of the family, nor intimate acquaintance, who have become accustomed to their appearance without these important organs.

It is a principle well established by experience, that a deformity, even hideous in its character, will, by daily intercourse, cease to attract notice. Take, for example, cross-eyed children; how seldom do parents notice this deformity so forbidding to strangers.

What consternation pervades the family circle when one of its members returns from the dental office having had his teeth extracted preparatory to an artificial set, while even yet the cheeks and lips are partly kept in place by the alveolar processes or sockets. A few weeks will suffice to reconcile the family to the disfigured countenance; and as the alveolar processes gradually absorb, and lips and cheeks shrink, the family as gradually come to look on the face as natural.

The patient again visits the dental office to have the artificial teeth inserted. Who now is best able to judge how the teeth should be arranged to restore the harmony of the features, the patient and accompanying friends, or the dentist, who, perhaps has not seen the face since the day the teeth were extracted? *We answer, the dentist.*

By dentist we do not mean every man who sticks two boards out against a building, in the form of a triangle, on which is gilded the word "*Dentist*"—but one who is a dentist in fact, and has studied the harmony of features; who, having the cheek-bones, nose and chin as guide marks, can fill out the mouth to harmonize with them; who, having observed the complexion of the skin, the color of the eyes and hair, and

the age of the patient, can select teeth of such size, shape, and color, as he finds nature gives in similar circumstances.

The judgment of the dentist should be respected, and then, after sufficient time has elapsed to wear away impressions created by the absence of teeth, and an acquaintance has been formed with the altered expression, if the friends and acquaintances do not become reconciled to the denture, the dentist is responsible. On the other hand, should the patients presume to dictate how the teeth should be arranged, what should be their color, shape, and size; in other hands, should they presume to occupy the position both of patient and of dentist, producing, as it certainly would, an unsatisfactory result, the responsibility would be their own, and any after change would demand a corresponding fee.

However great the anxiety of the patient may be as to the final result, it cannot exceed that of the dentist, for on its successful issue depend his interest and reputation. Our advice then is, secure the services of a competent dentist, and then implicitly rely on his judgment.—*Allport's Dental Journal*.

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LABORATORY HINTS.—It is just as important for the palatine surface of a plate to be smooth and polished, coming in such intimate contact, as it does, with the delicate mucous membrane, as the other surface. I believe, with many others, that with perfect cleanliness you rarely meet with a sore or scalded mouth, and with a rough, uneven surface, it is impossible to have perfect cleanliness. I have tried many ways to accomplish this object, but have found the following method the best and simplest, all things considered:

Always add the plaster, (a little at a time, stirring constantly,) to the water, not the water to the plaster. After getting the impression, (always taken in plaster,) give it a coat of shellac varnish, not too thin, and while it is drying run a ring of sheet wax around it, an inch or so deep. After the varnish is perfectly dry, instead of oiling, sprinkle powdered French chalk freely over the impression, then with a soft brush—I use a badger's hair shaving brush—rub every part

of the impression thoroughly, finally shaking out the surplus; then mix the plaster pretty thin, and pour, tapping the cup gently until the plaster commences to set. After it has hardened and you have cut away the impression, you will find the cast to have a perfectly glazed surface, free from air bubbles. Now proceed as usual and when the wax is removed dust the cast with chalk, the same as you did the impression. You will find after the plate is vulcanized, all that will be necessary to have a beautifully polished palatine surface, will be a short use of the brush wheel.

A word as to broken blocks. I am positive the only cause that ever broke a block is pressure--either too much rubber was used, the flask closed too suddenly, or at too low a temperature; or, lastly, the most frequent of all causes, neglect to remove all wax from the surface of the blocks. If any wax is left on the face of a block, there will be a space where the wax is melted out, and when the rubber is placed in behind it the block is almost sure to give way. Have the plaster set perfectly to the face of the teeth, and you will have no more broken blocks, at least that has been my experience. I saw in one of the journals, not long ago, where some one tried to explain that it was the "sudden pouring of hot water on the blocks that did the damage," citing as an example, that "his wife never poured hot water on glassware without expecting it to break." I will say to this gentleman, if he will watch his wife the next time she washes dishes he will find that she pours the hottest of water on porcelain with the greatest impunity, and if there are any glass teeth in the market I have failed to see them.—C. C. E., in the *Ohio Journal of Dental Science*.

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STUDENTS' SOCIETY.—At the monthly meeting of the Dental Students' Society of the National Dental Hospital, Mr. James Rymer drew attention to a condition in the mouth of a boy aged 18, where there appeared an absence (supposed to be developmental) of the front portion of the inferior maxilla, including the tip of the tongue. Mr. Alfred Prager read a paper on "Art in Relation to Dentistry," in which he urged

his hearers to observe what great importance must be attached to the expression of the face by the arrangement of the dental arch, whether in regulation treatment or in the artificial substitution of the teeth. He cited as examples the various expressions obtained by the great masters by the disposition of the mouth and teeth, and pointed out that with the same features a change could easily be produced from one of the highest intelligence to that of idiocy, and from repose to anger.—*Dental Record*.

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AMALGAM.—Dr. A. G. Bennett, in the "American System of Dentistry" says: "In spite of its ignoble nature, and in defiance of some prejudice and much opposition, amalgam has steadily won its way, till it is indorsed and used, to a limited extent at least, by many of the best operators. Though amalgam cannot be regarded as a specific for the arrest of caries, it is, with all its defects, the most durable plastic the inventive skill of the profession has produced. No condition or position of the teeth and cavities precludes its use, as it sets almost undisturbed by the presence of moisture; and on the score of comfort and economy to the patient nothing more could be desired. Its limitations, however, are often ignored. It may be said in general that amalgam, with all its real and alleged defects, including mercury as its essential ingredient, is to operative dentistry what vulcanite is to prosthetic dentistry. Both dispense with the highest skill, and lower and cheapen dentistry; but bring it within the reach of those who could not otherwise avail themselves of its service. It was opposed from the first, not because it failed to preserve teeth, but because when it preserved them best it discolored and disfigured them most; and it still often contains metals that have not been proven to be harmless, nor is it surprising that a material that saved teeth by destroying their beauty should have encountered decided opposition."

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In using the elevating forceps in extracting under third molars, a piece of sheet tin or other substance should cover the back edge of the second molar to prevent its fracture.

THE  
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No. 3.

ARTICLE I.

THE TYPES OF TEETH IN DISEASE.

BY JAMES F. RYMER, M. R. C. S.

[A paper read before the Students' Society of the National Dental College.]

There are three reasons why I thought this subject would be worth bringing forward:

Firstly, Our text-books and journals do not contain a large amount of information, and what there is is scattered over a period of 40 years; and that by collecting these fragments together they might constitute a homogeneous whole bearing upon the question.

Secondly, As undoubtedly the teeth are affected by many diseases, it appeared to me that if we took the trouble to examine more thoroughly the forms and defects of the teeth, it might in some ill-marked disease prove most useful, by giving to the diagnostician another valuable symptom.

Thirdly, As many of our younger members have not yet attended the Medical and Surgical Wards at a General



Hospital, and so have not had opportunities of studying the commoner diseases, such as gout, syphilis, &c., I thought by knowing what kind of teeth to expect in these everyday complaints, and which are seen in many of the patients who come to this Hospital, they would become more thoroughly acquainted with their peculiarities, and so, to a great extent, be able to spot gout, syphilis, rickets, struma, &c. I do not intend to (nor could I if I wished) enter at all deeply into the subject; but in the endeavour to point out some special features of the teeth, which we ought all to be able to recognise, I have been obliged to put in two or three queries, hoping that some of our more experienced and learned members will be able to fill them in for me. With these remarks, I commence with .

#### GOUTY TEETH.

Before describing these teeth, I will hand round a model of a well-marked gouty case. This patient had topi of the ears, reedy nails, and a good gouty history. It may be interesting to mention that Dr. Graves first called attention to the ground down condition of the teeth as long back as 1836 in the *Dublin Medical Journal*, and there explained that the grinding is due to an irritable condition of the dental nerves. All of us, I think, will agree that this does not explain the cause. Again, Dr. Horatio Donkin, in the *British Medical Journal* for February 21st, 1880, points out the following case of a family:—The father suffered much with gout; the mother's ancestors were full of gout. This couple had eight children; all of them had their teeth much worn down, and, Dr. Donkin remarks, when asleep the grinding produced an impressive non-harmonious concert. In the Norse type the teeth are, as a rule, solid, blunt, and thick at the edge, due to the wearing down; dark in centre, due in many cases to a formation of dirty secondary dentine; the incisors are more worn than the canines or molars. Gouty teeth have a tendency to

work out without caries, from an osteitis extending from the neck along and towards the end of the root. The gums are often retracted, and the mouth offensive, the latter being due to gouty dyspepsia. According to Dr. Milner Fothergill, there is often a well-marked osteal growth along the fang of the canine. A question now arises, What is the cause of this wearing away of tooth substance? Is it some malformation in the enamel and dentine? Or is it due to simple attrition, the result of some reflex irritation, as dyspepsia, &c.? It seems most probable that it is a combination of the two, for many people grind their teeth (as children with worms, &c.), yet their teeth do not wear down to the extent found in gouty subjects. Out of a large number of "gouty mouths" that I have examined at "Guy's," without exaggeration 80 per cent. either had gout or come from a gouty family.

Before leaving the subject of gouty teeth, I would like to mention rather a novel, at the same time an interesting case. A female patient, aged 30, came to the hospital one Friday, about a month ago, complaining of intense pain (not of a shooting character) in the right upper lateral tooth. Her teeth were distinctly gouty; I examined the tooth carefully, as did also the dental surgeon for the day, but we failed to find any caries or crack. It then occurred to me that it was a manifestation of gout confined to this tooth. I applied (by direction) a strong counter-irritant, chloride of zinc, around the gum and upon the tooth. I saw her a week after, when she said that all pain had disappeared in 24 hours after the application. I may add that the laterals were worn away considerably less than the centrals, and certainly there was no sign of sensitive dentine or pulp exposure. Was this a case of gout? If not, what was it?

#### STRUMOUS TYPE OF TEETH.

Scrofulous or strumous people often present signs of imperfect nutrition and development, their teeth being large

and of chalky appearance, and often have milk-white spots on the surface, and mostly upon the buccal surface. These indicate defective development of the enamel, with less gelatine than normal, and so the enamel is more easily acted upon by exposure to acid secretions, or to other external irritants. As these patients frequently suffer from "strumous dyspepsia," it is in those faulty spots that caries usually commences. The patient from which I obtained this model was of very strumous appearance, and although the teeth are not large, the model shows a typical case of strumous caries. The jaws are generally large in proportion to the teeth, and so crowding and irregularity is avoided.

#### PHTHISICAL TYPE OF TEETH.

Here the teeth are small and irregular, the palate is long, the central incisors lean towards each other, producing the "rabbit jaw;" or the teeth may be set at an obtuse angle, forming the "horse jaw." The teeth are very prone to caries, most commonly the upper incisors, especially the laterals (by some this is considered the test tooth for hereditary phthisis.) Decay begins at puberty and at the sides; and so differs from strumous teeth both in size and site of decay. Corfe says that decay is due to the imperfect flow of blood in the vessels of the teeth (!).

#### RICKETY TEETH.

Although there is nothing peculiar in the type of these teeth, yet there is something quite characteristic which I have not yet seen mentioned in our medical or dental books. It is as follows:—The temporary teeth are erupted in the normal manner, but at about  $2\frac{1}{2}$  to 3 years of age they loosen without any visible inflammation of the gums and drop clean out, the roots presenting no signs of any absorption. Through the kindness of Mr. Charters Symonds, of "Guy's," I had the opportunity of examining

quite twenty-four cases of children suffering from rickets. It was quite an exception to find all the teeth present; in some cases both the upper and lower incisors had loosened and dropped out. This rough model was taken from a squealing baby, æt. 2 ½.

The mother came to the hospital and asked me the reason of the teeth coming out. I examined the patient's tibiæ and found well-marked curves, the lower ends of the radi and ulnæ were enlarged, the anterior fontanelle was also large; and naturally I told the mother that rickets was the cause. She then told me that a year previously the child had been treated at the Middlesex Hospital for rickets. The permanent teeth are often, erupted later than usual and the centrals frequently have two small notches showing lines of development. They are either carious when erupted, or else decay shortly afterwards; hence it is important to recognise rickets by the temporary teeth, for then the parents can be told what condition the permanent will very probably be in. Rickets is most common in the extreme poor or in the later members of large families.

#### STOMATITIC TYPE.

Under this head one has to jumble together divers diseases, such as scarlet fever, measles, convulsions, jaundice, &c., which all seem to produce the same defects in the teeth. The temporary teeth, although unaffected, are often erupted later than usual; but greater interest lies in the permanent teeth, for during the period of the illness there is an arrest in the development of the enamel, and the dentine is seen to be a dirty brown colour. Thus, if a child is ill during the first year, and then recovers, the tip and half the lower surface of the central incisor teeth is devoid of enamel; and if at a year and a-half, there will be a ring of exposed dentine near the cervical margin.

## MERCURIAL TEETH

are closely allied to the above. Many people are dubious whether it is possible to distinguish a mercurial tooth from one due to stomatitis, but there seems to be one or two points characteristic; generally it is the lower portion of the enamel that is defective, differing from the stomatitic tooth, which may be faulty at any portion of the crown. The surface is seamed and jagged, yellow and irregular in form; the dentine frequently has rings of enamel on its surface, giving it a pitted appearance. In order to distinguish between a congenital and an acquired mercurial tooth, the tip or cutting edge is a sure guide (before the age of 20), for in the former the cutting edge is always devoid of enamel, whilst in the latter the enamel in this situation is often perfect for a distance of one or two lines.

As to the cause. Is this condition due to a simple stomatitis? Or is the pitting, &c., due to the removal of the forming enamel by the absorbing power of the mercury? Certainly many infants have convulsions entirely apart from dental irritation or the popular term "cutting the teeth," for convulsions in infants are due to a variety of causes, as diarrhoea, colds, &c., but still ignorant mothers blame the poor teeth and administer *ad lib.* "Stedman's Teething Powders" and other quack remedies, with the result that the previously healthy developing enamel is in some way affected by the mercury, either by absorption or by setting up a stomatitis. The six-year-old molars are the test teeth for mercury.

## SYPHILITIC TEETH,

or commonly known as "Hutchinson's Teeth," are now to be mentioned. Although by far the most important, they are the most easy to recognise, and are tolerably familiar to us all; therefore only a few words about them will suffice. A very interesting discussion about them will be found in

*The Lancet*, vol. i., 1876, which took place before a dental society, where the discoverer, Mr. Jonathan Hutchinson boldly defended his pet teeth, in opposition to the opinion expressed by members of the dental profession, who contended that this peculiar form of tooth was independent of syphilis, and when people were known to have been born with the disease, it was a mere fluke if their teeth were altered in form. Happily, now the discoverer has convinced all that syphilitic teeth are always a reliable guide. The chief points are: notching of the two centrals, which are always symmetrical; if the notching is not confined to the centrals, then the cause is most likely to be mercury, &c. The teeth are small, of dirty grey colour, and narrower at the cutting edge than at the neck. Again, on some of the teeth, other than the upper centrals, are to be seen several grooves along the surface, giving rise to the so-called "serrated teeth;" or there is a central projection, "pegtop teeth." The grooves and other characteristic peculiarities begin to get worn down by the age of 20; hence they are far more difficult to diagnose with certainty after that age. The temporary teeth are never affected, but are normal. Why? For the specific inflammation does *not* take place in utero, but calcification does.

There is yet one more rare form of tooth. I allude to "Mercurio-Syphilitic." It is only a cross between the mercurial and syphilitic types; by knowing these, it is easy to recognize. I had the luck to see a good example of this type of tooth at this hospital about a year ago.

I have just recently had the opportunity of examining a somewhat unique mouth, exhibiting very clearly three distinct forms of teeth—viz., syphilitic, mercurial and rachetic. The patient, a girl *æt.* 10, was brought to the National Dental Hospital from the "Home for Waifs and Strays." Unfortunately, as no person appeared to claim the child, no history could possibly be obtained.

The patient had only one upper permanent incisor which was peg-shaped, but had a rough irregular cutting



edge; the lower incisors were present, but so malformed as to appear as simple rough brown projections through the gums. I may add that the child had a large square head and face, the latter being of a decidedly "earthy" appearance; the elbow joints were much enlarged, evidently due to some early diseased action, and the child was very short in stature. These and other conditions pointed to congenital syphilis.

Now, in favour of mercury: The four six-year-old molars presented the typical mercurial appearance which I have elsewhere spoken about. In favour of rickets: All the deciduous set of teeth had disappeared, leaving the gums smooth and healthy, as pointed out in describing rickety teeth. In addition to this the upper jaw was small, due to arrested development; the lower jaw, although appearing larger, was of normal size. This disproportion between the size of the jaws has also a rickety significance.

Lastly I may add that the recently erupted permanent bicuspid were normal in number and of healthy appearance.—*London Dental Record*.

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## ARTICLE II.

### ANTISEPTICS AND DISINFECTANTS IN OFFICE PRACTICE.

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BY ALFRED T. PEETE, BRANCHVILLE, S. C.

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[Read before the South Carolina Dental Association.]

Every member of this Association is familiar with the chronic controversy respecting the germ theory of disease. That battle has been fiercely contested in the past, and is not yet settled in every detail. But the advocates of that theory have the victory within their grasp to-day, thanks to the labors of distinguished specialists, who have differenti-

ated and described for us so many species of micro-organisms. With reference to those organisms which are found in the oral cavity, we know but little. We cannot state positively whether or not they are an actual cause of disease, and we know next to nothing of their genesis or models of action. Analogy, however, and all the facts at present observed, point to one conclusion: These parasites are neither more nor less than a part of Nature's vast army of scavengers. Their office is to remove whatever is dead and in process of decomposition,—to attack and destroy what is weak, defective, or deficient in vitality—in order that Nature's cycle of death and life, of disorganization and reconstruction, may be continued.

At the present day no one doubts that there are worlds and systems and galaxies beyond the reach of mortal vision—almost beyond the confines of thought, but while recognizing the vastness of creation, in one direction, we sometimes forget that nature's works may be equally without limits in the opposite direction.

Every process of reasoning, and every recorded fact tends to assure us that our microscopes can never reveal more than a small part of the myriads of organisms which flourish and grow wherever there is disease, decay, or death, any more than our telescope can traverse the infinite regions of space.

Respecting most of the parasitic forms which infest the oral cavity, we know, certainly, that where they are present, healthy conditions cannot exist, and that they must be destroyed, or rendered inert, before health can be restored.

Now, I am satisfied that there are, to-day, thousands of dentists who give this subject but little attention, and who regard it as of slight importance. There are many operators, for instance, who daily prepare cavities in teeth, with excavator, bur, and chisel, then (provided there is no apparent bad odor) cleanse such cavities with water alone, dry them and fill at once. Is this practice reasonable or



safe? I admit that many teeth are saved by this method, but I believe that many more are lost by the neglect of additional precautions. If we could take account of all the gold fillings inserted, and count the number of final failures, the percentage would be startling. Doubtless a goodly proportion of failures are chargeable to want of thoroughness in excavating or filling; but, remembering the high standard of manipulative skill which obtains, nowadays, and seeing how frequently the work of our finest operators fail, after a few years, I am constrained to believe that there is another and a more potent cause.

How does any operator propose to remove infected matter and disease germs from any cavity? Surely not by means of steel instruments, and a syringe charged with water. Any microscopist would laugh to scorn such an idea. How shall we prevent the *future* entrance of such germs into such a cavity? Not, surely, by the simple insertion of gold, when we are told that a soft gold filling, under a powerful microscope, looks like a bundle of sticks, and a cohesive gold filling appears like a basket of chips; when we know, also, that germs of disease can find an entrance through the cut stem of a peach or apple and infect the whole fruit, we can scarcely rely on mechanical means alone for the preservation of a tooth once attacked by caries. Of some teeth it may be said, as of some men, that "lightning could scarcely kill them." They survive nearly any kind of usage. But, as a rule, I believe that neglect of antiseptic treatment in any case, invites failure. For this reason I never fill the smallest cavity without previous antiseptic treatment; the time required is so little, and the trouble so slight, that neither can be taken into account. Where septic conditions are apparent, I presume no operator would neglect the proper treatment, and I need say nothing on that point.

Let any one who questions the above theory, ask himself why so large a percentage of gold fillings fail in the practice of the most skillful operators, while phosphate of

zinc and chloride of zinc fillings (both antiseptic) always preserve teeth, as long as they remain intact in the teeth?

In considering the question of suitable antiseptic agents, in dental practice, we are confronted with a long list, from which every operator must make a selection. He cannot use, or even make fair trial of all. I shall briefly speak of those which have been most effective in my hands.

*Carbolic Acid* is an antiseptic of great power and is somewhat anæsthetic. The objections to its general use are many; it is an irritant poison, has a vile and persistent odor, and requires extreme care in using it. But for one valuable property I would discard it entirely, its value lies in its instantaneous escharotic action, favorable to healthy granulation, hence, it is still the best remedy (in combination) for many forms of odontalgia. For lining a cavity, after disinfection, and before filling, it is the anti-septic on which I rely. The preparation being—

Tinct. Gum Benzoin,	} <i>a. a.</i>
Acid Carbol.	

This applied to the dry walls of a cavity forms an imperious antiseptic varnish, while it cauterizes and seals up the canaliculi. It is useful in Stomatitis, etc., but we have other and better remedies in such cases.

*Creosote* I have no use for.

*Iodoform* is slightly disinfectant, and is, possibly, our best antiseptic, because it can be applied in *permanent* form. It is neither irritant nor escharotic, but is strongly anæsthetic. Since it can be given internally in six grain doses, without perceptible effect, it may be considered harmless in practice. Its most striking peculiarity is its healing and cicatrizing power, which makes it the best dressing for a wounded pulp. It is the one *permanent* trustworthy antiseptic for root fillings, and one of the best applications to ulcers and fistulæ. I have over fifty recorded cases of root canals filled with chloro-percha and iodoform, without one failure. These cases included putrid pulps, fungous

growth, blind abscess, etc. For preparing sponge graft I now use iodoform, according to Dr. Teague's formula, and find it superior to the old preparation of sponge sterilized with bichloride of mercury. The one objection to this agent is its odor, which is modified by the addition of camphor. If the new preparation, *Iodol*, proves to be equally valuable we can substitute it, and the sole objection will disappear.

*Listerine* is a mild antiseptic, is prepared in elegant form, is harmless and very agreeable, it is a valuable detergent, being an alcoholic preparation, and makes the best of tooth and mouth washes, and gargles. I have cured a fistula, extending from the gum over the right superior lateral, through the alveolus, across the palatal surface to the pharynx, by daily injections of warm water, followed by listerine (full strength) and finally packing the fistulous tract with sponge graft. Listerine is also, peculiarly suited for internal administration. It is not a disinfectant or germicide. Coming to the question of disinfectants and germicides, I know of but one agent that is absolutely free from objections in dental practice, and at the same time, always efficient.

*Bichloride of Mercury*, the most effective germicide, is a deadly poison, and too dangerous for general use.

*Chlorine*, in whatever form, is so powerfully irritant that a variety of evil effects may follow its use.

*Potassium Permanganate* has the bad property of discoloring every organic substance. I believe that I have seen irritation and inflammation follow from its use in root canals.

*Peroxide of Hydrogen* would be a perfect disinfectant in our practice, if it were not unstable. The extra atom of oxygen is so easily liberated by decomposition that we can never use this agent with entire confidence as to results.

*Sanitas*. In "sanitas" we have the ideal disinfectant, and experiments appear to have sufficiently established its great power as a germicide. It is the most rapid of deo-

deodorizers, is harmless, can be given internally, has a pleasant odor, and does not stain clothing. Its great value is shown in the fact that analysis shows a large percentage of peroxide of hydrogen, thymol, eucalyptol, camphoric acid, etc. It has considerable bleaching power.

I use sanitas oil for disinfecting all cavities to be filled, especially root canals. When first penetrating a pulp chamber, I inject sanitas fluid freely, as also into root canals, by means of a bent hypodermic needle, a device shown to me by Dr. Wright. For treatment of ulcers, where an escharotic is not indicated, sanitas gives the best of results. But it has manifold uses. The Sanitas Toilet Fluid is a delightful mouth wash, deodorizing the oral cavity without substituting any other odor. Used in a common atomizer, either of the fluids will remove all odors from the operating room, rendering the atmosphere fragrant as that of the pine woods. They will keep clean and fresh your spittoons, and all vessels about the office. The Sanitas Toilet Soap will remove from the operator's hand and person any suggestion of offensive odors. A little of the fluid should be kept in a glass salt-cellar, in which all instruments should be dipped to cleanse and disinfect them after using. The Sanitas Disinfecting Jelly, resembling vaseline, is an unequalled preparation for dressing wounds, burns and sores. Finally, all these preparations are so cheap that they can be used *ad libitum*. If any member present has not tried them, let me urge him to procure them at once.—*Southern Dental Journal*.

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#### ARTICLE III.

### LECTURES ON DENTISTRY FOR POPULAR AUDIENCES.

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All dentists of long experience have noted again and again how bitterly people regret the heedlessness of them-

selves or their parents, which has resulted for themselves in a ruined set of teeth, an enfeebled digestion, and all the chain of attendant evils which such a state of things necessarily brings about. "I cannot," such a one will say, "altogether blame myself for my neglect of my teeth; when I was a child I knew no better; indeed, I never realized how far the well-being of my poor teeth depended upon my care." And small wonder. Who, outside the profession, can appreciate the slight initial indications of decay? To most persons, save those who have been brought frequently into intercourse with their dentists, ignorance supreme about the physiology of dentition is the rule; they also know nothing of the measures necessary to induce healthy growth of the teeth; and further, are equally unable to direct reasonable endeavors towards maintaining their organs of mastication free from disease. As a rule, persons wait for the advent of toothache to tell them something is wrong with their teeth, and when this occurs, if children, their idea is to get the tooth pulled out—a plan too often acquiesced in by their badly-informed parents. Any measure, then, which gives hope that some instruction will be given in untechnical terms to untechnical minds in the many matters concerned with the growth, health and care-taking of the teeth, should be welcomed with pleasure alike by the dental profession and the public. We mentioned very briefly in our last issue that Mr. Henry Moxon, as dental surgeon in charge of the Anerley Schools, had undertaken a departure in this direction. Handling his subject in a plan, common-sense manner, he tells to the school children a straightforward unvarnished tale about their teeth, and attempts to inculcate habits of cleanliness and hygiene which, if practiced, must stand the members of his young audience in good stead throughout life. As each child will, in time, occupy the position of the center of some household, the good teaching received will, in coming years, be capable of bearing a rich harvest. It is easy to impress upon the child's mind habits and thoughts which



clinging throughout life, and influence the acts of adult life. In England we care so little about school hygiene that it is a rare matter to find large schools to which any special dentist is attached, the poor children being given over to the ministrations of the "doctor." The result of this arrangement is better imagined than described. In schools also where physiology is taught, which is seldom the rule, the little pupils are duly instructed concerning the development of the teeth, and are posted up with the latest theories about the enamel organ and dentine, but no mention is made of how important is the preservation of the teeth for the due carrying out of the vital process. It would be well if every large school, whether founded for the children of the well-to-do or for those less carefully nurtured, was placed in the hands of a competent dentist, who should not only treat his little patient's aching members, but who should be responsible for systematic instruction imparted to the pupils concerning the uses, the preservation, reparation and vital value of their teeth. Such teaching could be made very interesting and effective, and might be so given as to appeal directly to the children themselves, inducing them to emulate each other in a useful rivalry in cleanliness and general attention to their organs of mastication. We have insisted above upon the enormous value which must follow such instruction, and we have little doubt that before very long we shall see Mr. Moxon's very excellent example largely followed.

At present but few dentists have the chance of giving such lectures, but ere long the appointment of a dental surgeon to every workhouse, school, prison and reformatory must be an accomplished fact, and then a wider scope will be opened to the profession in this particular field of usefulness. One word of caution must, however, be uttered. It is above all things important that lectures should not be given for the sake of mere talking. Whatever is done in this direction will need to be carried through with tact and knowledge, singleness of purpose, and a sincere desire to

benefit the audience. If any of these motives are lacking, by all means let popular lectures alone. It is true that such things may be most useful, but it is as irrefragable that they may be rendered baneful to the last degree.—*The British Journal of Dental Science.*

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ARTICLE IV.

PATHOLOGY OF DENTAL CARIES.

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BY E. PARSONS, D. D. S.

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[Read before the Georgia Dental Society, May, 1887.]

DEAR BRETHREN:—Your Worthy President has assigned to me the subject of Pathology of Dental Caries,—a subject which has been discussed at the meetings of nearly, if not all the dental societies in this country. The chemist and microscopist have done their utmost to reveal the cause of dental caries, and so far as I know, without adding any great amount of knowledge on the subject. There are two forces in nature's action and reaction. When these forces are harmonious they both work for our good. All creation is an out-birth from centre to circumstances. This is caused by the infinite source of all motion, without which physical existence is impossible. It is only by the aid of science we can understand anything of natural phenomena as to its real cause. To the uneducated, day and night is caused by the sun moving around the earth, which is only the appearance and very far from the true cause.

Human teeth are evidently designed by our All-wise Creator for an important use while we remain in this world. If they fail to accomplish the desired end we must look for the cause in imperfect organization or the activity of some destructive agent acting on them. You all know

there is a great difference in the density of human teeth, hereditary, or from a want of insufficient supply of phosphate and carbonate of lime for the growth and maintenance of good, hard teeth.

It is reported by some observers that a cow while bearing and suckling, if fed on swill slops, will not only lose her teeth, but the calf will have soft teeth. If not demonstrable it is reasonable to suppose that a full supply, or a deficiency in our food and drink, is the main cause in the different density of human teeth.

Nearly all the habits of civilized man are artificial, and the laws of health are being constantly violated, hence, disease in some form or other, apparently originating from vitiated secretions, is the cause.

The pathology of dental caries opens to us a wide field for our investigation. The chemical composition of enamel and dentine are well known. Alkali may dissolve the soft tissues, but some form of animated substance, of which oxygen is the base, can alone disintegrate the hard tissues. My experiments and careful observations lead me to conclude that there are three sources of acidulated substances that cause caries in human teeth; acrid secretions of the glands, acrid exhalations from the lungs, and fermentation. If but one of these conditions is present, the progress is slow, but if all three are acting the progress is rapid, especially in soft teeth.

A few attribute a very different cause for the destructive work known as dental caries. The microscope reveals the fact that the microbe, a small species of animalculæ, is in vicid secretions and the debris found in decayed teeth, and hence, they conclude they are the cause of the disease. I have yet to learn that any living organisms has any power to bore a hole in the enamel of a tooth, and to use the theory is as absurd as to assert that the sun revolves around the earth, causing day and night, and is quite as far from the truth. We often find caries on the labial surface of the front incisors. What but chemical action can



account for this fact? To comment on the various causes of vitiated secretions and acidulated breath, would take up too much room in this paper. I will only say they are mainly hereditary, predisposition, pernicious habits of living, and fermentation.

I cannot present anything new on the subject you have assigned me. If our people knew and would obey the laws of health, we should soon have a much healthier population in every respect. But this will not be in our day, for all bow to the goddess Fashion, and suffer the consequences. If anything new can be evolved by a discussion of the subject, I shall be glad to know it. The most intelligent and best men in our profession may be led to err as to the true cause of disease, by appearance which are often deceitful.

All true science is based on facts; all else is mere speculation. So far as we increase our knowledge of facts, we are in the true path of scientific progress, increasing our ability to easily diagnose any case that present itself for treatment.

If I am not able to attend your annual meetings, my interest in your success is the same as when with you. Considering our feeble beginning, the Georgia State Dental Society has accomplished an immense amount of good, both to our profession and the public. We have effectually closed the doors against ignorant pretenders, and elevated the status of dental science in this State. You have caused to be enacted the best laws for the protection of our profession that now exist in any State in this great republic. Every qualified dentist in this State ought to be proud of what this Society has done for them, and should, if practicable, attend our annual meetings; it is a duty they owe this Society. There is no limit to scientific research. There is now much that is not known, but is gradually being evolved, that will benefit both our profession and suffering humanity. With a united and earnest effort to make this session more useful than any previous one, you are bound

to succeed. To the younger members let me say, success largely depends on earnest efforts.—*Southern Dental Journal*.

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## ARTICLE V.

## "BLIND ABSCESS."

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BY J. A. THORNTON, D. D. S.

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[Read before the Georgia State Dental Society, May, 1837.]

To see is to know. But where the vision cannot penetrate, our success is wholly dependent upon experimental observations, which must of necessity be exercised with great care. Nor can we be too careful in anything we do, for our errors are here to stare not only us in the face, but to be commented upon by those whose knowledge consists in the amount of conceit usually attended with those who think they know it all, yet, when the test is applied, they only defend themselves with a child's logic, which is "because," and beyond because they can adduce no argument to sustain their severe criticisms upon those whose sole study and ardent desire is for the promotion of comfort and pleasure to those who are so unfortunate as to be forced to seek us for our skill. Nor are we always crowned with that degree of success for which we so ardently put forward our most earnest endeavors.

But were we to give up and say that on account of one failure it could not be accomplished, not only would we suffer defeat, but the hand of progress, which has so bountifully poured her plenty upon us, would be closed, and we, of necessity, be forced to see our profession, which we all love, lose its onward march and fall into the ruts of retrograde, and ere a few decades all the foundation of years of study and practical application, pass away and be forgotten. But we are not of that kind, and I thank God

for it. But, on the other hand, when we fail it only renews our energies and makes us the more persistent to accomplish that success which always crowns diligent inquiry.

Now, as to my subject, perhaps there are some here who work and treat the trouble in the same manner as I; yet, as I have never read anything just like my own, I give it, and if it be that, or the same of some one of you here, perhaps there may be others to whom it may be of service.

Only one point in the following do I claim to belong entirely to some other than myself. Yet if there are others who have, as I have, been using their energies to conquer the most stubborn of our duties professionally, I only hope that he, or they, may have the coronet of success to fall upon him.

My own idea of Blind Abscess is where, at the apical foramen there is a sac containing pus without any fistulous opening, or any chance for discharge through the nares, or down the throat through the nasal channel.

It lies dormant until we, with our broaches, approach it, and then, like a little wasp, it shows how patiently it has waited for something to disturb it. Now for the approach, which I always accomplish by drilling directly to the nerve canal, being always careful to prevent any debris being lodged so as to be passed into the canal or through the apex, especially, for the presence of any foreign substance is sure to raise a huge disturbance, and that always retards our progress in effecting a cure, which is necessarily slow, as you never know what you have done until you have finished and the time for early trouble has passed.

After opening I make a solution of—

Tinct Iodine f3 iij.

Aqua Ammonia f3 j.

The iodine is antiseptic, has a tendency to prevent putrefaction and, also, is a disinfectant. It also acts as an escharotic without any tendency to discoloration. Unlike carbolic acid it does not coagulate the albumen and thereby form a stone foundation for acute inflammation, the termi-

nation of which is quite plain to all. The ammonia combines with the iodine and forms a transparent fluid, which, instead of discoloring the tooth, will tend to bleach it.

After having the tooth ready for treatment, I make of very fine grain hickory, a lot of broaches (wood is preferable because it is not affected by the solution like metal) around which I wind absorbent cotton and dip them, just as I use them, in the fluid, and the first I pass about half way to the apex to see if the canal is clear of debris. I then approach nearer and nearer, till I reach the foramen (apical), and I continue to apply till the last vestige of pus disappears, and dismiss my patient for twenty-four hours, leaving the tooth open and giving special directions to be careful to pack cotton loosely in the cavity during meals, but to remove as soon as the meal is finished.

The second sitting I pursue the same course and give the same directions. The third day, after having gone over first and second day's work in the same manner, with one of my broaches loosely wrapped with cotton and thoroughly saturated with the solution I pass it into the canal and dislodge the cotton loosely, so as to allow passage of gas, and if no soreness arises I allow it to remain for forty-eight hours. But should acute inflammation arise I remove the cotton at once and paint the gum over the root (camel's hair pencil) with a solution of iodine and aconite, equal parts, (not my own) and allow the tooth to rest till all traces of tenderness has passed, and then resort to the same means as first described for the same length of time and try again. However, with proper management, not one time in ten will any trouble arise. But now for the end which, after the third day, and you have closed the tooth loosely each sitting with fresh cotton, after having gone over third treatment, which should be at least from every forty-eight to seventy-two hours, till you can pack the canal tight and have no bad results. At which time saturate cotton with five per cent. solution carbolic acid and pack it as tightly as possible and allow it to remain,

after filling with gutta percha, for a month, or even longer, then remove your filling, and also the cotton, and after one or two treatments with the carbolic acid you can then fill permanently and feel perfectly easy as to results.—*Southern Dental Journal*.

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ARTICLE VI.

CLAMP PLATE.

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BY DR. W. G. BROWNE.

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The mean between extremes is most to be desired and is most productive of good results. Acknowledging the great merit of bridge-work proper and the demerits of the plate covering the roof of the mouth, I have made a compromise between the two which embraces the ability to remove and clean as with the plate, and the convenience of the bridge in not becoming an obstruction in the mouth—a plan better adapted to the skill of the average practitioner and the purse of the average patient. I do not claim that my plan can be used in all cases, but principally for bicuspid and molars, and sometimes for incisors.

For a description I refer you to a typical case. Here is a model and piece that has been worn seven years. You see the two right superior bicuspid are gone, with the first and second molars remaining; that the artificial teeth are ground to fit snugly between the molar and cuspid, slightly overlapping the molar, and a small plate of rubber just large enough to saddle the ridge and extend back along the palatine sides of the molars and clamp the second molar. This plate is about one-fourth of an inch wide, and is not an inconvenience to the patient. Your attention is specially directed to one of the essential things requisite to success, viz., the stability of the piece is due largely to the clamp on the second molar. You will observe that I do

not care for the piece to fit closely along the palatine side of the molars, but that it does bear on the palatine and buccal surfaces of the second molar, thus clamping it. Never fit a piece in such manner that the change of position of the natural teeth can affect the stability of the artificial teeth.

It often happens that the wisdom tooth is in position and cone shaped in such a way that it is not available for clamping to; in such cases I use the first molar alone, grinding the artificial bicuspid to overlap it on the buccal side, thus making one bearing for the clamp, and extending the piece to a little beyond the opposite point to get the other. A number of pieces of this kind have been in use for a long time, and are eminently successful, the patients wearing them expressing the greatest satisfaction.

We find many cases where several teeth are missing from the lower jaw—for example, one bicuspid and two molars, with third molar in position. This clamping process is available here by putting it on the molar and partially around the bicuspid, but not necessary to clamp it.

I present also for your inspection a piece with only one tooth on it, to show you how small and light the appliance can be made, and which will also show how incisors and cuspids can be inserted if the other teeth are in favorable condition.

I have no doubt that some will think that there is not much new in this. I have only to say that it is new to me and I have never seen a case made by any one else, and if this system has been known to any of you, why have you not published it?

As before intimated, the bridge-work is good, and so are the prices obtained for it; but how many of the average dentists can make a durable piece of it, and how many of our patients can pay for it? But here is a system that can be worked by any good dentist, and paid for by any one, and can be removed at will and cleaned.—*Proceedings of Georgia State Dental Society—Southern Dental Journal.*



## ARTICLE VII.

EXTRACTS FROM LECTURES ON OPERATIVE  
DENTAL SURGERY.

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BY WILLIAM ST. GEORGE ELLIOTT, M. D., D. D. S.

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[Delivered at the National Dental College.]

Gold as a filling material has been used for a long time, but there is no evidence that it was used by the ancients; it has been stated that gold stoppings have been found in some of the Egyptian mummies, but more thorough examination has shown that what was taken for stoppings was the ornamental gilding of the lips, more or less common at that early period. We cannot go back, I think, beyond the latter half of the last century. It was mentioned by Fauchard, 1785, and was in common use about 1800. The first American record we have is of some work done in London by a Mr. Waite about 1815, although it is quite possible that Woofendale first introduced it into America about 1795.

Gold, as used for stopping teeth, is not the commercial article classed as pure, and worth some £4 per ounce, but as made by different manufacturers, is not only of great purity, but of marked ductility.

Anyone who has done much in alloying gold for dentures, solder, &c., knows how easily this ductility is removed; a mere fraction of 1 per cent. of arsenic, or lead, is quite destructive to this necessary characteristic—indeed the copper and silver ordinarily used to alloy with, must be of great purity, or at least, must contain as little as possible of the objectionable materials. We require in gold great purity, not as some seem to think that it may be cohesive, nor on account of the ductility, as gold may be alloyed largely with some metals without materially injuring this property or destroying its cohesive character,

but to withstand the secretions of the mouth; the purest gold will discolour in some months, not necessarily in those badly cared for, as it sometimes noticed where the greatest care is taken, but in those mouths where there seems to be a development of *aqua regia*, as I have invariably noticed that when discolouration does exist, it is apparently the purple of Cassius (a double salt of gold and tin).

Gold, as used in the arts, is not only comparatively impure, as it contains more or less alloy, but it is beaten out much thinner than we use it. 200,000 sheets are required to make an inch in thickness.

While practising in Japan, I was in the habit of procuring some gold from China, made by the natives; it was apparently pure, and as ductile as that furnished by the depots, but I could not get it thinner than No. 60 or 80. As thick foil, it seemed to answer every requirement.

The Portuguese coins called *Johanns*, on account of their purity, were formerly used by the profession; at that time, early in the century, every dentist made his own gold, by rolling down these coins to a thickness of No. 10 or 20, and it was not until 1835, as far as I can ascertain, that the manufacture of gold for dental purposes was regularly taken up, Abbey, of Philadelphia, having commenced at that time.

In 1840, Dr. Westcott, of New York, called attention to a peculiar property of gold foil, it sometimes becoming sticky and thus objectionable. This property was subsequently utilized by Dr. Arthur, of Baltimore, in 1855. Before this, however, in 1853, Dr. Watt, of New York, and Mr. Joseph Barling, of Maidstone, Kent, brought out about the same time a new form of gold. It was then, and still is, called sponge gold, as well as crystal gold, &c.; it is made by precipitating from a solution of the chloride of gold the pure metal, by the assistance of electricity. It resembles a piece of exceedingly fine sponge, and is usually prepared for the cavity by tearing portions from the mass of the necessary size, annealing them, and forcing them



into position, either with serrated hand instruments or mallet pluggers. I have long since abandoned the primitive mode of preparing it referred to, instead of which I use a rotary knife of one inch in diameter, and driven by the dental engine; it is best used at a high speed, 3,000 revolutions per minute, and will cut the gold into any sized blocks required without the least condensing it.

After many years' use of foil, I gradually took up sponge gold, and now use it exclusively. No. 1 and 2 of Watts' I find best suited to my requirements; the advantages I think, it possesses over foil are: it is more plastic, and lends itself more fully to the necessary packing against the walls of the cavity; unlike foil, it does not ball up under the plugger, nor block the way to undercuts, &c. It is more readily attached to the walls of the tooth, and is consequently not so easily displaced; it requires less retaining points and undercuts, it produces a hard surface by malleting, and retains a burnish much longer than foil. As a possible objection, I think it may not be quite as strong as foil for bridging from one point to another.

Soft foil, or that form of gold that came first into use, was employed as a filling material, just as paper would be used for the same purpose; the general principle recognized being that each piece or pellet should go from the bottom to the top of the cavity, like, in fact, cigars in a case.

As originally used, the small pellets or sections of rope were forced by hand pressure against the walls of the cavity, other pieces were added and packed laterally, until the cavity was fairly well filled; then a pointed or wedge-shaped instrument was forced into the mass, and the hole enlarged by lateral motion. Other pieces were added, as far as possible, until no more could be introduced; the projecting mass was now condensed by plugger and burnisher, and finished off.

Subsequently, foil, folded in the form of tape, was used in the same way, while, still later, this tape was wound round a bit of wire or five-sided broach into a cylinder.

These were made of uniform length for each cavity, but varied in thickness. Cylinders were generally used with a foot-shaped instrument, and were condensed from the distal end of the cavity forward.

Since the introduction of the mallet about 1868, they are frequently consolidated by this means, and when the cavity is completely filled, they are malleted on the surface.

The cylinders, as originally made by hand, were small and hard, being wound tightly around the wire.

They are now usually made light and soft, as by many operators they are also used, after annealing, in cohesive work. The use of the hard cylinders has been largely discontinued, although they have some advantages over the others.

It requires more skill to use non cohesive foil than the cohesive, and as there is some elasticity in a stopping made of this material, it preserves the tooth better; that is, a soft foil operator will be more successful in the class of cavities he will undertake, than one who only works with cohesive gold.

The class of cavities suitable for this gold must have four walls, more or less, while, of course, cohesive gold can be put almost anywhere that anchorage can be secured.

I hope, gentlemen, you will all be eclectic in your practice; use soft foil when you can do so, for generally you can make a successful operation in half the time you can with cohesive.

Of course, you will aim to become expert operators with both kinds, and you must also not forget the virtues of amalgam and oxyphosphates.

To return again to cohesive foil. Dr. Jack, by the use of retaining pits, was enabled to overcome some of the difficulties first experienced in the use of this material, and rapidly became popular, introducing the era of contour fillings (which have done much to advance our profession, but which, like other good things, may have been carried too far,) I should think that not half the cases are worth

the labour, pain, and money spent on them, particularly now that we have something so much better in gold crowns.

The union of surfaces in cohesive foil, although sufficient is at best but partial, at least as shown in the plug. We often hear of stoppings being taken out of a tooth or experimental matrix, and rolled out into a sheet as proof of their solidity (it is the rolling out which solidifies them); the force applied in the mouth is not sufficient, nor are the instruments adapted to such a result. They should have ovoid smooth points ordinarily like the goldbeater's hammer face, and the force applied at right angles to the surface of the filling; consequently such instruments and the force necessary, are inadmissible in the mouth.

We have to use serrations to prevent our pluggers from slipping, and the serrations do not leave the gold in the best condition for the union of surfaces.

I am in the habit of using occasionally for flat work, like in erosions, a flat square-edged, smooth instrument, and where the cavity is accessible and square with the instrument, one with an ovoid face, because it is only with a surface of this kind that you can expect to spread the gold and thoroughly condense it.

Now while it is not necessary to get perfect union between the pieces of gold in order to save teeth and retain a fair surface, do not for a moment undervalue condensation; nothing will condemn your work as much as lack of solidity, no feature is as important. A thoroughly solidified plug is retained much more firmly by the tooth, and will require more force to dislodge it, less undercuts are necessary, there is less give, to produce loosening; in every respect, for the work, if not for the patient's feelings, solidity is a most desirable quality. Do not, gentlemen, fall into the error which led me astray for some years. Do not think that surface malleting will take the place of homogeneous solidity. I first learned this fact by noticing in old fillings that those portions which had a hard found-

enamel, &c., kept the best surface. It was solid at the start, or it will loosen, through. Now, to get this desirable result. Fine gold cohesive work generally; for this reason, the mechanical mallet and next to it I place self malleting. It does itself twice as quickly as an assistant then by having the assistant feed the gold, and so on.

I used the electric mallet, but have given it up slow. I experimented a good deal to proceed in increasing the force of the blow without increasing the magnetic force, increased the polarizing force of the carbons with increased E. M. F.; introduced a circular switch, which gave me control of all and sundry, and a new magnetic dynameter, and kept records for months of the E. M. F. and Amps of each cell taken every few days, collecting data for future use, but I was gradually taking up crystal gold, and found the mallet not suitable, using instead a heavy eight ounce hammer.

You will probably have noticed that burnishing destroys cohesion. Why, I cannot tell you; sometimes it will; at other times it will not. It is this refusal of the pieces to unite that prevents us burnishing in the gold at times; even the experience we have derived from the Herbst process, in 1883, has not given us the required knowledge. In using rotation in condensing gold, sometimes the layers are rendered quite non-cohesive; at other times they are irregularly so, and sometimes quite cohesive. We are told by the inventor that when a layer is found to be non-cohesive, it should be again burnished over by the engine point, and it will become cohesive. I cannot say that I have found it so, although my experience with this process is not very extensive. As it was found that minute portions of gold became attached to the rotating point at first, recourse was had to polishing with fine emery cloth, but latterly the points are made with agate blood-stone, or

some equally hard material. I have used aluminium bronze points for the process, but I do not know that it possesses advantages over steel. In the Herbst process, enough gold either large soft cylinders (Wolrab's), or any soft make of gold (personally I prefer crystal), is taken to quite fill the cavity. This can be either burnished in with any point which will enable you to reach all parts of the cavity, or first cover the gold with a piece of cotton wool or Japanese paper, and burnish on that.

The latter process leaves the gold in a more even and better adapted condition, but also leaves it quite non-cohesive.

The cavity can then be scraped with a sharp excavator until cohesion is restored, or a new layer can be attached if desired, by the aid of sharp serrations.

Cohesion may not be necessary if there are still walls to the cavity unfilled, or if you can get sufficient undercuts for the new layer. Layer after layer is added until the cavity is quite filled. The process can never be fully accepted, I think, for many reasons: it is not more rapid than self-malleting, less so perhaps than the engine mallet; the process is unmechanical, and has no tendency to inspire the operator with confidence,—in fact, there is an element of uncertainty as to durability that is not encouraging.—*London Dental Record.*

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#### ARTICLE VIII.

### AMALGAM AND MATRIX.

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BY DR. FRANK W. LOW, BUFFALO, N. Y.

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Whatever may be urged for or against the use of the matrix in general, in operation for compound or crown approximal cavities, whether in bicuspid or molars, if amal

amalgam is to be used as the filling material, the matrix ought to be considered an indispensable adjunct, because in no other way can the contour of the tooth be so perfectly restored, while the introduction of the filling is converted from a complicate to a very simple operation. The amalgam can be impacted and hardened by direct pressure, and so thoroughly burnished as would otherwise cause protrusion of the mass at the cervical walls; nor will there be any danger from mastication, even if put to use immediately upon completion of the operation.

By many who work amalgams of inferior quality, this last statement will be read with incredulity, and the objection will be raised that the removal of the matrix is liable to dislodge the filling. Let me detail a process which, if accurately followed, will both banish all doubt and overcome all objection:

The decay having been excavated and the cavity otherwise properly shaped, it is advisable, as a final precaution against the possibility of dislodgment, to make with a sharp fissure bur two marked dovetailed enlargements in the crown opening well back in the body of the tooth, one approaching toward its buccal, the other toward its lingual wall. When sufficient separation can readily be obtained, unless one may prefer to use the device invented by Dr. Wm. B. Miller, the Jack's matrix should perhaps be chosen in preference to all others, and as two sets—one thick, one thin—are now devised, they will meet the exigencies of a majority of cases. However, if the teeth approximate so closely that sufficient separation seems impossible, or if the separation is too great and the matrix cannot be held in position by impingement against the adjoining tooth, then the choice of a suitable band matrix is indicated. The Ladmore-Brunton clamps and matrices (an English device which has the advantage over its American competitors to public favor, in that it is adjusted and tightened with a flexible key) and those devised by Dr. S. H. Guilford, are much alike, while the Loop matrices, invented by Dr. Frank



Creager and by Dr. W. Pinney, more nearly resemble each other in the manner of their construction; and yet another, differing considerably from both the bands of Drs. Creager and Pinney, is the device of Dr. T. W. Brophy. These are each and all, in their several ways, excellent devices. He who has any one of them is pretty well equipped; he who has them all is truly fortified against any contingency.

To guard against the possibility of slipping, to insure perfect adaptation to the cervical walls, and to induce a slight additional separation for the easy removal of the matrix when the operation is completed, it is well to force a wedge of orange-wood (dipped in copal-ether varnish and so sharpened as to conform to the V-shaped space between the necks of the teeth) in between the matrix and the adjoining teeth. A magnifying glass should be used to inspect the cavity as soon as the wedge is adjusted and excised to make sure of this perfect adaptation, for it is an all-important requirement to the finished work.

In mixing the amalgam, great care should be taken to combine the alloy with *pure* mercury in definite proportions because the hardness of the plug, as well as the immunity from shrinkage, depends upon the perfect satisfaction of certain natural combining weights of the different metals with the mercury of amalgamation, so that either a lack of or surplus of mercury is disastrous to this perfect combination. The best method for mixing is that recommended by Dr. Thos. Fletcher, namely: "Put the amalgam in a glass mixing tube; cover the open end of the tube with the finger and shake briskly for a few seconds; work the resulting mass into little disks with a cylinder mould."

The writer invariably makes use of the little balance devised by Dr. Fletcher for combining amalgam in proper proportions; and prefers to all others his Platinum and Gold Alloy. The amalgams of other manufacturers may be equally good, but their proportions for perfect amalgamation should be determined and stated, so that they may be accurately weighed for combination as above recommended. No amal-

amalgam can be successfully used with a matrix that will not burnish hard as soon as the cavity is filled, and *no amalgam will allow of sufficiently hard burnishing* if moisture is allowed to come in contact with portions of it while being introduced. On this account it is well, even after the operation is completed, before removing the rubber dam or napkin, to varnish the finished plug with copal-ether varnish.

A most bright and beautiful luster may be given amalgam (which in most instances remains for years) by reburnishing and polishing at a subsequent sitting, and no time is better spent, even by the busiest operator, than to beautify his work after completion.

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ARTICLE IX.

OBSERVATIONS AND EXPERIMENTS ON THE  
ACTION OF CERTAIN ANÆSTHETICS,  
ALONE OR MIXED, ON THE  
FIBRES OF THE FIFTH  
PAIR OF NERVES.

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BY DRS. LAURENCE TURNBULL, E. P. REICHERT AND JOHN  
D. THOMAS, PHILADELPHIA, PA.

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Dr. Reichert, at my suggestion, was so kind as to perform with us the following experiments in regard to the action of certain anæsthetics when the fifth pair of nerves were irritated. The following was the Doctor's reply to my letter of April 27, 1885:

"In regard to your inquiry about Lauder Brunton's experiments on the reflex inhibition of the heart, I may say, that I have read his paper but do not remember where it was published. We can cause a reflex inhibition of the heart, by irritating any sensory nerve by any of the ordinary means of irritation. I have found in some of my experi-



ments (not yet published), that you can produce a greater degree of inhibition by irritating certain sensory nerves than by irritating the trunk of the vagus itself, when the same degree of irritation is used in both cases. The easiest way to demonstrate the power of the branches of the fifth nerve, when irritated to cause inhibition, is to anæsthetize a rabbit and place some strong aqua ammonia to the nose. This acts as a powerful irritant to nasal fibres of the fifth, and brings about reflex inhibition—complete stoppage if necessary."

Dr. Reichert took a large sized rabbit and placed it cautiously, but with some difficulty, under the influence of a mixture of ether and bromide of ethyl 3 ii to Oi; requiring a considerable amount to bring it fully under its influence. The trachea was opened and a tube introduced. The carotid artery was opened, cut and ligatured and a tube introduced which was filled with soda solution, free from air bubbles, and connected with Ludwig's Kymographion. A cylinder with blackened paper was set in motion by clock-work, and a delicate pen of thin platinum foil was made to record every second by means of an electromagnet. Dr. R. then caused reflex inhibition of the heart, by irritation of the nasal branch of the fifth pair of nerves, by touching the nostrils with a strong solution of aqua ammonia, when chloroform was applied. The animal was allowed to recover. Chloroform was then placed upon a sponge and applied to the tube only. In an instant the rabbit was dead, showing the much more dangerous character of that agent as an anæsthetic. An examination of the organs of the animal was then made, by removing the sternum and ribs, when it was found that death had taken place from the stoppage of the heart's action, the lungs were found perfectly normal as well as all the organs excepting the liver, which was badly tuberculous, a condition frequently found in the rabbit. A perceptible heart motion continued for some time after death, but with insufficient force to propel the blood, the indicator remaining perfectly quiet.

A dog was then anæsthetized, but required a much smaller amount of the ether mixture than the rabbit, and the irritation applied as before. The same experiment was performed upon it, but the action on the heart was not as prompt. After a short time, the dog was to all intents dead, from too large a quantity of the mixture, but by active compression and relaxation of the chest walls by the hands of the operator, it was resuscitated. Then the dog was placed fully under a solution of chloral by the vein, the superior laryngeal nerve was dissected, and an induction current was applied. The effect upon the heart was instantaneous, to such a degree as to cause complete suspension of its pulsation. The result was the same when the current was applied directly to the pneumo gastric.

A rabbit was then placed under the anæsthetic influence of ether, to prepare him for the experiment; he was then allowed to recover. The arterial pressure and pulse were then recorded, aqua ammonia was applied to his nostrils, with a result similar to that observed in the first experiment. There was administered a combination of nitrous oxide gas and chloroform, by means of the chloroform mixer of the Buffalo Dental Manufacturing Company. The chloroform is confined in a receptacle below the gas passage, which is closed by a screw-valve. A stem, covered by a fibrous sheath, extends downwards from the valve into the chloroform. When the mixture was made, the valve was loosened by the wheel handle and drawn upwards, raising with it the covered stem which brought with it a certain amount of chloroform into the gas passage, where it was exposed to the current of gas as it passed to the inhaler from the bag. A small piston closes the passage to the chloroform reservoir, as the handle is raised, cutting off the escape of vapor. With this apparatus the mixture may be made or withheld, and more or less chloroform be given, as the judgment of the operator may dictate. The results showed the advantage of using a full supply of

the nitro-oxide gas, and not a partial anæsthesia, which is a most unsafe plan, as the apparatus is not designed to save the quantity of gas administered.

The last experiment made was allowing the animal fully to recover, from the mixed anæsthetic, and placing it under the full effects of Squibbs' stronger ether for anæsthesia, which is now so much employed in surgery. The ether was crowded upon it until the *respiration and heart had almost ceased to beat*. Then was introduced into it a solution of 100th of a grain of sulphate of atropia, to see if it had any power to stimulate the heart or restore respiration, but it produced no such results, and the animal was dead.

#### OBSERVATIONS BY DR. TURNBULL.

The more frequent employment by surgeons of Squibbs' ether, or what is known as Ether Fortior U. S. P., the stronger ether—a liquid composed of about 94 per cent. of ethyl oxide and about 6 per cent. of alcohol, and only containing a little water—brings this anæsthetic near to the character of chloroform. This more powerful agent than the ordinary ether has certain advantages in the rapidity with which true anæsthesia is produced, but as a matter of course enhances the dangers attending its use in a certain class of individuals, as the aged, the inebriate and the very young. If the same amount of caution is employed in the use of this more powerful agent as in the use of chloroform, the number of deaths would be less. It must be always borne in mind that in full anæsthesia, no matter what agent is employed, there is a suspension of the life forces, and but a step to death. The administration of morphia subcutaneously will increase the risk, as there are many individuals who have a certain idiosyncrasy, and cannot bear even what is known as a small dose of morphia without great disturbance of the stomach, or faintness. It has been suggested to add to it atropine, but our experiments, I think, demonstrate that it will not relieve the heart

when fully under the influence of the stronger ether. It is also true that small doses of the morphine are now recommended, but our experience has fully proven that when ether is employed, there are no agents which relieve the irritation of the broncho-pulmonary mucous membrane so well as keeping the skin warm and free from moisture or draughts of cool air, and now and then dipping the sponge in hot water, and getting rid of cold water, and even ice which forms on the inhaler or sponge. Another good plan is to keep the bottle of ether in warm water (not hot.) Above all, no one should give the ether who has not had some practical experience, and is not desirous of witnessing the operation; let the whole attention be given to the patient and never crowd it after the patient has become fully anæsthetized. Keep the influence of the ether by short and slight inhalations, well diluted with warm air. In the use of chloroform it should never be employed unless to the very aged, the hard drinker or young children, or in midwifery or gynæcological operation, when the patient can be placed in the horizontal position. There are a few rare cases, where, after a most careful and conscientious use of ether, the patient will not come promptly under its anæsthetic influence; then it will be proper to use hydrobromic ether or chloroform.

We consider all mixed anæsthetics more dangerous than one alone, but the physician should have a full knowledge of the constitution of the individual. There is not quite so much risk to life with chloroform as with ether if morphine is employed subcutaneously, but owing to the same reasons expressed under ether, I do not recommend it, and I know of but few surgeons, either in this country or in Europe, who resort to its use.—*Dental Advertiser.*

## ARTICLE X.

## IMMEDIATE ROOT-FILLING.

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BY J. SMITH DODGE, JR., M. D., D. D. S., NEW YORK, N. Y.

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This practice may be familiar to others, but it came to my mind as a direct application of Listerian surgery, and I am not aware that anyone has adopted it outside of my immediate circle. At any rate, the uniform results of about a year's experience lead me to publish my plan.

What is here said relates exclusively to roots from which the dentist removes a portion of living pulp. It may be only that little fibre near the apex which is so slow to die, or it may be any greater amount. But unless the last of the pulp removed gives pain, or (what I like better) followed by a drop of blood, this article has no reference to that root. And if the final bit of root-pulp is taken away alive, it makes no difference what may have been the connection of the rest. When I have a hopeless pulp to get rid of, with immediate root-filling in prospect, I generally make an application of arsenic and wait till the bulk of the pulp is dead. Those who, after removing this, pass a fine broach actually to the apex, will seldom fail to find the desired remnant of life. I have several times disregarded the slight apical soreness which often accompanies the death of the pulp, and have had no bad result.

The process is simply this: Being sure that a shred of living pulp remains, I make everything ready for the entire operation, with full protection of the tooth from saliva. The living shred of pulp is quickly removed; any blood that follows is absorbed by a thread of bibulous paper passed up the canal; the strongest possible solution of carbolic acid is injected into the canal, churned to the apex with a broach, and absorbed with a thread of paper, then a thread of gutta-percha (Hill's stopping) previously prepared and cold is passed as far as possible into the

canal, and with warm wires packed to the very end. When the filling is pressed against the apical constriction it generally gives a little pain, which is satisfactory as showing that the canal is full. When the whole root is filled to the pulp-chamber, it is forever disposed of.

Of course, if there are two or three roots, the same process is applied to all which have canals large enough to permit the manipulations. If any canal is too small for this, it may be freely carbolized and left. I have never, under this or any other treatment, seen trouble from the pulp in a canal which was too small to admit Johanson's broaches.

This finishes the roots. The dentist may do what he likes with the crown.

I have not counted my cases, but they cannot be less than twenty-five or thirty, extending over nine or ten months. Not a single one has had any subsequent trouble. The longest pain was for about an hour, and then absolutely ended. Nearly all have been entirely right by the time the roots were filled.

The plan is based on the well-proved fact that a clean flesh-wound, disinfected and closed from the air, will not suppurate. Abundant experiment has proved this, and all surgeons act on it daily.

To tear away a shred of living pulp leaves at the apex a clean flesh-wound.

If the pulp were alive up to the pulp cavity, I should not care for the carbolic acid after removing. But as the filling material must pass through a part of the canal which may have become infected, it might carry along germs enough to do mischief, and so I fill the canal with the antiseptic.

It is my belief that the habit of waiting a little after the pulp is removed, to see if there will be any trouble, is like those prophecies which are said to fulfill themselves. The waiting brings the trouble.—*Dental Cosmos*.



## ARTICLE XI.

## WOMEN IN DENTISTRY.

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MRS. R. B. RAMSAY, D. D. S., PITTSBURG, PA.

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It would be interesting to study the various causes that led men and women, in the industrial world, to drift apart, till each were strangers to the other's work; and why, after the lapse of centuries, they are now uniting and working side by side.

Our imagination can date the dentist back to the primitive services of herbs and teas, hot salt, and hideous extractors, available to both sexes; but while the man advanced, secured the aid of science, established colleges to propagate learning, he pronounced his work a profession and constituted himself sole possessor and proprietor of the field; the woman continued the domestic treatment, propagated the superstitious arts, and submitted to his usurpation.

But some revolt occurred, and to-day women are given the freedom of dental colleges in America with the accompanying legal right to practice, and this privilege is mainly due to the efforts of a few noble men. Of these let me mention Professors Peirce and Truman, who, with opinions far in advance of their time, stemmed the tide of opposition (of no mean proportion, but of intelligent men whose convictions were to them strong proof of right) and with a Spartan courage persisted till they secured for women an inestimable privilege. Some day, when the full freedom of women shall be assured, the efforts of those who struggled to produce it will be a part of history.

Admitting women legally to practice is a check on the pernicious custom of the widows of dentists continuing the business, using the name and rights of the deceased, hiring incompetent men to transact the business.

Have women a right in dental schools? It is true

these colleges were founded by men, and with money belonging to men, but some women bore these men, and some women helped earn this money; and since men have gone into domestic life for new avenues of labor, it is right that women should look to other fields for her life's work. But right or wrong, women dentists are an established fact; if every college door were closed against them, there are now women and money to start other schools.

But we do not anticipate a return to the old *regime*; for after a fair trial it is conceded that the presence of women in our colleges is beneficial to the young men, they show less disposition to rudeness, profanity and indulgence in evil habits which unfit them for professional gentlemen.

The profession generally has accepted the women gracefully, not as a necessary evil but as a power for good, knowing that the women who have joined their ranks are from a good social strata, and must eventually elevate the calling socially and professionally. Dental societies have given them a welcome and assigned them duties in public meetings. We should feel grateful to the profession for this privilege. At the door of Jefferson and the University of Pennsylvania she stands unnoticed, though holding her D.D.S. aloft and pointing to the arrangements made to admit this class on a third term, to receive the learning and benefits of M.D.

Are women an honor to the profession? Why should they not be? Those who have graduated have proved themselves apt pupils, entering the profession with an earnest endeavor to do her best. This is sure to bring esteem and success. Women are peculiarly adapted for the care, patience and delicate touch required in dental manipulations. The general public accepts the services of women. This is proven by the success of those following the business. That the women have not more fully availed themselves of the privileges is the result of long years of training called "womanly;" but this is a misnomer, for the world is ceasing to value a condition that in adversity



means poverty and dependence. But women are awakening. In the Pennsylvania Dental College there are nine women enrolled this term as students. In the Philadelphia Dental College twenty-six have been graduated in the past, and in the present class there are seven enrolled and two or three others attending occasionally. The Baltimore College graduated three women and then refused further admission, nor will they to-day admit women as students. How manly!

Two of these thirty-two women graduates came from Germany, at a great expense, with attending sacrifices of leaving home and sojourning alone in a strange country. They spent the time required by our colleges, and are welcomed home with greetings of honor and respect. They practice their art proud in the title of "American Dentist;" for thus they are styled by way of honorable mention, and a dentist there ranks above a physician in social caste.

The presence of women in the dental profession is one more star in the escutcheon of a profession that has advanced more rapidly from its birth than any other. Dentists have seemed to agree that nothing is impossible; prejudice has nowhere an abiding place. They are willing to cast out old ideas and accept new theories, put them to the test, and if good, assign them a place in the dental curriculum. Even so have they accepted women. They have extended to her the right hand of fellowship and given her a place in the front ranks.

Tell me the position of women in a nation and I will tell you the status history of that nation. The more intelligent and honored the women, the more highly civilized the nation. An ignorant and oppressed race of women are incapable of producing a race of civilized men. Women must be given her God-given privileges or the nation retrogrades. Show me the profession that turns a deaf ear to the knockings of this embodied spirit of civilization, and I will show you a calling whose precepts and practices are but a shade from the dark ages. This 19th century, more

than any in the past, is one of change—constant, persistent change. Everything in science, religion and art, is being tested. The next century will dawn on a glorious state of unity, and surely the women will be there.—*Items of Interest.*

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## THE AMERICAN DENTAL ASSOCIATION.

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For the information of members and delegates attending the meeting of the Association at Niagara Falls, Tuesday, August 2nd, I will state that the Casino has been engaged for four days. The following are the hotel rates:

AMERICAN DENTAL ASSOCIATION—HOTEL RATES AT NIAGARA.—*International Hotel*—Accommodates 300 guests. Special rates to members and families, \$3. *Prospect Park House*—Accommodates 100 guests. Special rate if double beds are occupied, \$2.50. *Hotel Atlantique* (German)—Accommodates 50 guests. Special rate if double beds are occupied, \$2. *Cataract House*—Accommodates 300 guests. Regular rate (no reduction), \$4. *Hotel Kaltenbach*, (German)—Accommodates 50 guests. Regular rate (no reduction), \$3. *Niagara House*—Accommodates 75 guests. Regular rate, (no reduction), \$2. *Temperance House*—Accommodates 75 guests. Regular rate (no reduction), \$2.

The railroads have given reduced rates as follows: All roads comprising the Trunk Line Association, the Southern Passenger Association, the Central Traffic Association and the Western States Passenger Association will carry delegates, members and their families for one and one-third fare for the round trip. Certificates must be signed before returning (by Dr. Geo. H. Cushing, the Secretary), in order to get the reduced rate. Pay your full fare going to Niagara, and take a receipt from the ticket agent, at the starting point. Tickets are good, going three days before the meeting and returning three days after the meeting.

Blank certificates may be obtained from Dr. S. A. Freeman, 14 Court Street, Buffalo, N. Y., and Dr. L. D. Shepard, 100 Boylston Street, Boston, for all points east of Buffalo and Niagara Falls.

Dr. W. C. Wardlaw, Augusta, Georgia, will furnish blank certificates for all points south of the Ohio river, and the south-west.

Dr. George H. Cushing, 96 State Street, Chicago, and Dr. A. W. Harlan, 70 Dearborn Street, Chicago, will furnish certificates for all western points and Indiana, Ohio, Michigan and all points covered by the Central Traffic Association's lines.

The Committee has had great difficulty in getting reduced rates, and it is hoped that as many members, delegates and their families will attend the meeting as can do so, to make of this a notable event in the history of dentistry. Turn out in full force, and bring new inventions, appliances and anything of interest to those assembled.

Yours truly,

A. W. HARLAN,

*Chairman Executive Committee.*

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### MISSOURI STATE DENTAL ASSOCIATION.

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The twenty-third annual meeting of the Missouri State Dental Association was held at Kansas City, June 21st and 24th. The following officers were elected for 1888:

President, Dr. Wm. N. Morrison, St. Louis; 1st Vice-President, Dr. S. M. Nicholson, Fayette; 2d Vice-President, Dr. J. F. McWilliams, Mexico; Rec. Secretary, Dr. John G. Harper, St. Louis; Cor. Secretary, Dr. Wm. Conrad, St. Louis; Treasurer, Dr. James A. Price, Weston.

The next meeting will be held the first Tuesday after July 4th, 1888 at Pertel Springs, Warrensburg, Mo.

WILLIAM CONRAD,

*Cor. Secretary.*

Hotel Beers, St. Louis, Mo.

# Monthly Summary.

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**PROXIMAL DECAYS.**—My method of treating proximal decays is to space the teeth apart considerably with cotton, wedging them twenty-four to forty-eight hours, and then contour them boldly, bracing the teeth firmly against one another, and if possible increasing the size of the arch, and bridging the amalgam or filling used across from one to another, almost amounting to bridge-work, with amalgam, going thus to the other extreme of that heroic cutting recommended by Dr. Darby. Teeth that are alive I have no solicitation about. They are cast out in nature's own time and in her own way, as the leaves drop from the trees in autumn.

In my early practice I used to pride myself on being very handy with forceps to aid nature in getting rid of deciduous teeth or roots, and conscientiously thought I was doing my patients good, by cleaning up their mouths in such manner as to have them look clean at least, when in reality I was doing them irreparable injury. I can now look over a set of teeth where the remains of the old ones are sandwiched between the new, and know that I am doing my patient a great benefit by leaving all of these unsightly looking pieces in the jaw, but I grind them smooth with corundum wheels, removing the sharp points and shorten them down sufficiently to prevent contact with the teeth of the occluding jaw.—*Dr. Morrison, in The Archives of Dentistry.*

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**A METHOD OF TESTING THE VITALITY OF A TOOTH'S PULP.**—To determine whether a tooth's pulp is living or dead is the first question to be decided in the diagnosis of every case of odontalgia, the dentist is called upon to treat. Many obscure cases present in which this is a difficult point to ascertain, as occasional errors in the practice of the most careful

will witness. Therefore any improvement in method which will facilitate the detection of the pulp's condition and render the result more certain, will be appreciated by all. A simpler and more efficient method of applying heat than that usually employed for this purpose, was suggested at the April meeting of the Odontological Society. It is as follows: The preliminary isolation and drying of the suspected tooth and the immediately adjoining ones is the same as by the old method, although the rubber dam is not so essential. The tooth is then tested by applying to it a piece of gutta percha which has been heated over a flame. It takes hold and transmits its heat at once and there is an almost immediate response if the pulp is living. If there is no response, it may, without being again heated, be applied to one of the adjoining teeth, with a known living pulp, and the comparison noted. The old method of testing with a heated steel instrument is terrifying to a nervous patient and the response if the pulp be alive is often tardy in coming or may be entirely absent. Apprehensive patients under the influence of fears or imaginings will frequently, when a heated instrument is applied, mislead the operator by declaring that a tooth is sensitive when you know it to be pulpless.—*Dental Review*.

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DR. RICHARDSON recently lectured before the Society of Arts (London) on the painless extinction of life in the lower animals. At the Dogs' Home it appears that over 6,000 dogs have been painlessly killed during the past seven months. The principal agent used for the narcotic action is carbonic oxide, passing, at 80° Fahr., over a mixture of chloroform and carbon bisulphide into a lethal chamber, in which chamber as many as 100 dogs can at once receive euthanasia. Dr. Richardson described a small apparatus which, after long trials, he has completed, in which from one to six animals can be painlessly killed, and which is so portable that it can be wheeled from a central station to any house or street ready for immediate use. By an extension of the same design the author next intends to apply it to animals of the larger kind

that are used for human food, its application to the slaughtering of sheep being already quite feasible and inexpensive. Why could not a similar apparatus be substituted for the hangman's rope? Already a commission has been appointed to investigate and report to the Legislature of the State of New York the most humane and practical method known to modern science, of carrying into effect the sentence of death in capital cases, by which it would seem that the subject is commanding some attention.

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COMPOSITION FOR DUPLICATING MODELS.—As I have much improved the duplicating composition which was brought under the notice of the Society two years ago, I have much pleasure in forwarding a sample for the members' inspection, also a model and plate, showing the perfect accuracy of the duplicate. In working the composition, I found that it absorbed water and tended to impoverish the material and destroy the perfectness of the duplicate obtained. After trying several varnishes, and finding each defective, I think I have obtained the desideratum in a solution of india-rubber and benzoine. The solution is floated for a moment over the composition, and the surplus instantly poured off, and there is left behind an almost imperceptible coating, which is absolutely waterproof. As it now stands, I think it is perfect, and would be pleased by members trying the composition and varnish, and at next meeting giving an expression of opinion.—*Whitehouse in Dental Record.*

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DENTISTRY RECOGNIZED BY THE AMERICAN MEDICAL ASSOCIATION AS A SPECIALTY OF MEDICINE.—While we have held all the time that dentistry is a specialty of medicine, yet, this formal declaration of the American Medical Association lifts a barrier that has existed since a separate degree was created, and separate schools established. The medical profession has, of late years, shown a liberal spirit toward dentistry, as represented by its leading men. In their Congresses

they made room for us, only, however, under the title of M. D.; and now, while the D. D. S. is recognized, it is only under a higher order of its acquirement that it is to be so. It now remains to be seen if our colleges will pull up to it or treat the recognition, as some individuals will do, unsought and unwanted.

While the opportunity did not wait for the full fruition of our plan, yet we find that this is a glorious epoch in our history. We must now consider the question of "A Specialty" as settled, and it is for us to move up to yet higher attainments. By carrying out the requirements of the resolution we shall occupy the same relation to medicine in this country as surgery does to medicine in England.

Dr. N. S. Davis, President of the International Medical Congress, to whom we are indebted for this resolution, states very clearly his reasons for doing so, and what he hopes to see it accomplish. The manner in which the resolution was received is certainly strong evidence of the estimate placed on dental surgery by the medical profession of America.

Dr. Allport, president of the American Dental Association, is also entitled to much favor for his work in the matter.—*Southern Dental Journal*.

**GOLD SOLDER.**—Dr. McKellops recommends that 89 parts of the plate used (be its carat what it may) be alloyed with 7 parts of silver and 4 parts of copper. This will always prove reliable, flow easily, and most nearly preserve the color of the plate. Should it be necessary to solder *over* this solder, reduce it further in the same proportions, *i. e.*, using the solder itself as the gold to be reduced.—*Dental Register*.

**OBTUNDING SENSIBILITY.**—If you have never tried it, ask your next patient for whom you are excavating a sensitive tooth to hold his breath after inflating his lungs. This is often done, if you have observed by the patient involuntarily. We were struck with this means of enduring pain, by animals, when a boy.—*Ex.*



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ARTICLE I.

EPILEPTIFORM NEURALGIA OF THE FIFTH  
NERVE.

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BY PROFESSOR VICTOR HORSLEY.

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He said: It is not my intention to weary you with details of cases of neuralgia that I have treated by operation, but I wish to bring before you certain points of interest in these cases, and more especially points in regard to diagnosis, points upon which I myself desire much information; for these cases, as you may well imagine, have only come into my hands at a very late period after the onset of the mischief, the earliest  $3\frac{1}{2}$  years after the pain had made itself very obvious, and the latest 7 years after. In each of the cases, after the operation, there has been only one story—gratification at the relief from pain, and regret at the loss of sound and useful teeth. Of course it is on this latter point that I hope to-night to have the benefit of your wide experience given me. If we can diagnose the exact conditions under which the most inveterate form of



neuralgia arises, we shall, I think, make one step forward in the right direction.

Now, if a patient comes to us and complains of infra-orbital pain, I take it we first put to ourselves the question whether the pain is caused by mischief of a central origin, and if of a peripheral origin, whether the disease is in the trunk of the nerve or in the teeth. It is not necessary for me to do more than mention the possibility of its being occasioned by intra-cranial disease. I think the general rules for the detection of intra-cranial disease suffice for its diagnosis. The remaining question, then, is whether it is possible to diagnose affections of the trunks of nerves from diseases of their terminations?

Perhaps if I just mention to you the principal points in the cases which I have treated, two of whom are in the next room, it will serve as a direction to us. The first case is a man aged 60, who suffered for seven years before I saw him. All the branches of the nerves were affected but it was clear that the middle division of the fifth nerve was the starting point. The pain he felt and referred to was located in the centre of the malar bone, and from that point radiated all over the branches of the left fifth nerve. I operated on the infra-orbital nerve, and I was convinced by means of the electric light that I had removed the whole of the nerve from the foramen rotundum, but although he was relieved, the pain recurred in a few days in the palate. To make sure I cut down upon the palate at the hinder part of the alveolar border, and that operation was followed by complete relief of pain for seven months. But then the pain recurred in the inferior dental nerve, and then I performed an operation for removing a considerable piece of the inferior dental nerve. I believe that this is a secure success. It will not be sufficient for us to destroy only part of the nerve unless we destroy the whole of that part. Now, the operation I suggest for reaching the nerve below the foramen ovale seems to me a simpler one than has been suggested recently, within the last two months, by Albrecht.

of Vienna. Albrecht proposed to cut down from the zygomatic arch; but you can get at the nerve perfectly well by exposing the masseter, trephining the lower jaw, and cutting upwards into the sigmoid notch with the bone forceps, and following upon the nerve, you can trace it up to the foramen ovale. I performed this operation upon the patient about twelve months ago, and he had complete relief until this last week, he tells me he had a twinge in the palate. Whether it is going to be the usual slight recurrence I cannot say. However, he has had more than a year of complete relief.

Well, then, the next patient was also a man, aged 65. I simply performed the operation for removing the middle division. This was followed by complete relief. He remains cured so far; that was done about three months ago.

The next case is that of a matron of an infirmary who had suffered for three and a-half years; she also is relieved.

In the last case, I performed the operation a few weeks ago. It was the worst case I have ever seen. The patient, a lady, for a fortnight had not been able to feed by the mouth at all, she suffered intense pain, and the parts were a great deal swollen and glazed. The operation was of the severest kind. Although the pain was intense in the fifth nerve, it was radiated to the other branches.

Well, these are briefly the details of the cases upon which I now propose to dwell for a few moments.

I think, for the purpose of fixing the points or the problem before us, we had better consider for a moment the anatomy of the mixed nerve as a whole, and consider the question on a broad basis.

In the first place we must admit that whatever may be the ultimate physiological explanation, there must be fibres which, if damaged, disease will occur.

Next we have fibres of common sensation going to the skin. Next we have fibres going to the vessels; and lastly, we have fibres of special sensation—in these cases

of course terminating in the teeth. Then mixed nerves—in fact, so far as we know, all nerves—are provided with nerves of common sensation, that is to say, there are end-organs which give the trunk of the nerve common sensation. This fact is a comparatively novel one. The stem upon which the observations are based is shown here; it explains pathologically the occurrence of great pain in the periphery.

The problem for us to-night is whether we can diagnose between the inflammation of this portion of the nerve and of terminal portions. Here is the point upon which I must crave your charity, because, as I said just now, I have no experience in the initial stages of the trouble, and it is upon this special point that I ask for information. But, speaking from the other point of view of cases as I have seen them myself, it occurred to me to ask whether we could not attempt to diagnose much in this fashion:—If the mischief affects the termination of the nerve, it will be clear that there can be no changes in the other portions of the body supplied from the other branches of that nerve, except by reflex action through the whole system, that is to say, we could not expect to get any wasting in the face by neuralgia commencing only at the teeth, or if we had, it would be very slight. If, on the other hand, you had mischief in the trunk itself, it is obvious the converse ought to be true, viz., that the trophic changes ought to be very marked. Well, I believe that in the case, that these are not accompanied by any change through reflex mechanism. Now, what are the changes I spoke of wasting, but there are more minute pathologic changes. The patient I quoted to you as having been operated on last presented these changes in the most marked degree I have ever seen: the lower lip was greatly swollen and excessively sensitive, and the skin glazy and shiny. The same thing was noticed by Mr. Walsham in his account of two cases of the same kind. Of course one notices that the vessels may sometimes be dilated, or others just the opposite.

Well, now, as to common sensation, it is perfectly true, in an ordinary case of toothache you may observe, that the pain radiates not only from the parts affected but to all the branches of the fifth nerve, but I do not think it has ever been observed that there have been changes in the skin. What I would point out is this, supposing that we are dealing with pain in the upper canines; supposing, again, that pain not to be complicated with local inflammatory causes, I am not aware of cases being recorded in which the skin was hyperæsthetic or anæsthetic at a distance so far as I know. Well, this is the case when the disease is in the extreme trunk of the nerve.

Sometimes you get a case in which, if you gently rub something over the skin, it gives extreme pain, whereas, if you press it tightly there is no pain at all; that is well known, but it has never met with any explanation. That is a very striking form of hyperæsthesia, and it is one which I believe is only connected with those cases where the disease is in the trunk of the nerve.

Lastly we come to nerves of special sensation. In the case of teeth, of course we have hyperæsthesia in varying degrees. I would ask for information on the point, whether in those cases where pain is distinctly removed by extraction of the teeth, and then observed to recur in the next tooth, whether there was any difference in the patient's feelings; I mean to say, was it an exact repetition of the original feeling, first, when the tooth is pressed upon, beginning slightly and becoming intense, did the whole process go through the next tooth? Because, *a priori*, it would follow that you are dealing with a case of local affection, and perhaps it would be good policy to go on extracting. But, as I say, that is one point upon which I desire very greatly to be informed.

Well, now, suppose we take up the character of the pain itself and analyse it as a means of diagnosing these two conditions slightly more closely. Well, I think one generalization should be considered, viz., the place or origin of the pain—where did the pain first arise?

In the first case I told you of the pain began in the bone. I find in the majority of cases the patient says it begins in the teeth, they also have it in the bone and also in the skin; of course observations of this kind are calculated to help. If the patient states distinctly that the pain begins in the bone, and from there goes to the teeth, it should tell us that the origin is in the trunk of the nerve, and that after extracting one or two teeth we should stop and go to the trunk of the nerve.

Then, again, if the pain commences very distinctly in the skin, and subsequently only affects the teeth, it would point to the mischief beginning in the trunk. Finally, if it is referred by the patient to the teeth, it might begin there, but it might not. It may be only a question of referring the pain wrongly, just in the same way that we refer pain to the little finger when it comes from the elbow. Then comes the next point, the *mode* of its origin. I suppose it is within the experience of all here that it is impossible always to find from the patient what was the original cause of the mischief. One will say it is a bad tooth, another mental worry, another cold, another injury, and so on. I have not been able to find out any common mode of origin. But, there again, my experience as a surgeon is extremely limited, and on this point I desire further information, but I may say, if the pain occurs gradually, and there are teeth in the neighbourhood of the seat of the origin of the pain as described by the patient, well then, I suppose we may say the teeth are the primary source of the mischief. If the pain occurs suddenly we may say it is in the trunk.

Well, we take another generalization concerning the pain and discuss its character. If it is of a constant character, it would seem to have in most cases a peripheral origin; if it is intermittent, it would seem to be in the trunk but in a very severe case you may get these points confused. In the last case I quoted, the pain was distinctly intermittent. There were periods of complete relief from neuralgic pain.

Now, fourthly, with regard to excitant causes. Can pain be brought on—in other words, what is the cause of pain? If you find that pain is brought on most commonly by movement, it would seem to be characteristic of affection of the trunk of the nerve. The patients all state that movement of the jaw brings on pain; in fact, on one occasion I secured rest to a patient by tying up the jaw. It is perfectly obvious to any of us that the inferior dental nerve is pulled upon in opening the jaw to eat or speak, and this possibly will bring on pain. I am not aware that the same importance is to be attached to movement in ordinary dental irritation.

Well, as to the question whether different re-agents excite it or not, I think we can gain very little information. The same patient will tell you that cold brings it on, and another day that heat does so, so that there is no hard and fast line to be laid down on that point.

Fifthly, I think the extent of the pain is one of the most important points. If, in addition to the fact that you have severe pain in the distribution of the nerve you have distinctly tender spots along the branches of the nerve, you have an indication that the whole nerve is in a state of hyperæsthesia, and the pain is primarily due to inflammation.

Finally, gentlemen, a few remarks concerning treatment. I have endeavoured to lay before you very briefly and sketchily the outlines upon which we can discuss the origin of the pain, which is a practical matter to be dealt with. Now, as regards treatment in those cases in which extraction has not been proved to be of final service. All those cases I have treated by drugs, such as opium (of which, in one case, I gave 30 grs. a day, and in another 23 grs. a day), &c. All these narcotics have ultimately failed; they have relieved the pain for a time, but then made it much worse. The very small experience I have had has shown me that croton-chloral produced more effect than any other drug taken internally. Then, with regard to local adminis-



tration, we have seen various injections hypodermically made. Cocaine always seems to fail, and necessarily the introduction of the needle brings on a paroxysm of pain. Large doses of morphia may be given without any relief of pain. Some patients say it makes the pain worse. There seems to be some action on the nerve tissues, which is not altogether favourable.

With regard to surgical treatment of the nerve, there is no doubt that nerve stretching should not be performed upon the branches of the fifth nerve, because it involves just as many risks as cutting out the nerve, and the pain invariably recurs. Neurectomy, on the other hand, is generally successful. As to details in carrying out surgical treatment, of course I must not occupy your time here, but allow me to say, from seeing the operation performed under different circumstances, that I do believe that success is due to the efforts one makes to obtain primary union—this always supposing that the whole nerve, or a considerable portion of the whole nerve, has been completely removed.

Lastly, as regards the effect of neurectomy—the general effect on the parts and the general effect on the patient—I have not seen any bad effect follow. Of course, it was to be feared that by removing the nerve one might interfere with the nutritive condition, but as a matter of fact the areas which the nerves supply are remarkably limited, the area of the infra-orbital nerve are extremely small, and then again, the nerves which are most affected fortunately do not supply the most important parts. It is the nerve supplying the cheek and the lips; fortunately the nerve supplying the eye is rarely the seat of the mischief, and hence we see the possibility of escaping trophic changes; but I have really come to ask for information and not to give it. And the information I wish for is with regard to the character of the pain, the seat of the disturbance, the mode of its onset, the cause of its excitement or origin, and the possibility of the affection of other branches of the same nerve.

If these points relating to the earlier stages of the disease are cleared up by the very wide experience of the members of this Society, I think I may say we shall make a very great step forward in the right direction.

After some observations by Mr. S. J. Hutchinson, Mr. Betts, and Mr. Ashley Barrett,

The President said : There is one great puzzle to me about these neuralgia cases, and one to which I have never been able to formulate any explanation at all—I hope Professor Horsley may be able to throw some light upon it—that is the great relief of pain which is often given by doing the wrong thing; by doing the thing which you are told by subsequent experience of the case cannot have gone to the root of the evil. For instance, you cut the inferior dental nerve; well, it will very likely stop all the pain for a few weeks, but often you find it comes back as badly as ever. You clearly in your first operation and in your second operation had not got to the site of the trouble; and yet, somehow or other, you have altered the nutritive conditions, and have done something which, for the time being, has arrested the pain. I have in my recollection a case in which the nerve was first divided at the mental foramen, giving the patient great comfort for a time: he could eat, shave, or talk without any unpleasant sensations; but the pain came back. The nerve was then drilled down upon in the canal; that set him perfectly right for eight months. On the recurrence of the trouble, the operation was repeated, and the drill was run down upon the nerve in the same place. But it did no good. Subsequently the patient went to Mr. Durham, who dissected back, within the mouth, to the orifice of the dental canal, and stretched the nerve severely. This did good for the time. But the point which I should like to press upon Professor Horsley is, why the doing of ineffectual operations which do not reach the seat of the disease so often seem to do good, when subsequent knowledge shows that it could not have got to the site of the evil?



There is one other point, and that is the trophic alterations that are to be seen in these cases, and which Professor Horsley lays great stress upon, as showing the lesion to be in the nerve trunk. I have myself seen three cases of great severity in which the trophic lesions, if they existed at all, were so inconspicuous as to escape observation. One of these were treated electrically with some success.

Mr. Henri Weiss mentioned a case of peripheral neuralgia, in which a man dreaded any pressure on his face. The attacks would not come on from either heat or cold, but by pressure, and more particularly by pulling the moustache.

Mr. J. Smith Turner said Professor Horsley asks for further information as to the peculiarity of the special sensibility which occurs in patients who suffer from this disease, and that is that the skin is exceedingly sensitive to the soft touch, but that by hard pressure the same sensibility is not produced. It seems to me that this sensibility is a good deal the same which the eye experiences on being handled by the skillful or unskillful operator, as the case may be. The expert oculist handles the eye in a manner which seems to us almost brutal, but causes no pain; the timid operator approaches the eye gently, and produces an amount of pain which makes the patient shrink from his touch. I have noticed cases in which patients do shrink when the skin is slightly touched in the neighbourhood of the pain, but if you press hardly the pain is not felt. It seems to me that pressure obtunds pain. In the experiments which have been carried out with reference to this nerve stretching theory, there has been, I think, a good deal of what is called nerve pinching; and this nerve pinching has destroyed sensibility in some cases and effected the very same thing as nerve stretching. We have many obscure conditions of pain in the teeth which render peripheral diagnosis sometimes difficult. I have now a case in my recollection which was brought before the attention of

the profession—I think it was before the Odontological Society was established—in which intense pain was suffered under movement; when the patient was at rest there was no pain, comparatively speaking. A tooth was removed, and on examination it was found that there was a detached piece of secondary dentine in the canal of the tooth, which moved about as the patient moved, and produced pain. Pain was also produced by the pressure of putting the head on the pillow. With regard to end organs, if my memory serves me, attention was drawn to the subject in a paper by Professor Marshall some three to five years ago, and a diagram was drawn of the nerves—portions of nerves which seem to spring out from the trunk on the main nerve. I believe Professor Horsley was present, and referred to them as the *nervi nervorum*. These filaments, which are nerves of sensation supplying the nerves themselves, are the subject of considerable irritation; and if we have these nerves springing from the inferior dental nerve after it enters the bony canal, we may thus be able in some measure to account for the cessation of pain when we do the wrong thing, and it returns again when the nerve assumes its wonted condition.

Mr. Stocken: Some time ago I brought before the Society two cases which came under my observation. Perhaps I may be permitted to mention them again, as some little light may be thrown on the discussion thereby. One was a very severe form of neuralgia. The lady was unable to speak without great distortion of the features; the tongue was swollen, the eye-lid drooped, and the saliva was constantly running out of the mouth. She had tried several remedies, some homœopathic ones, but got no relief. The peculiarity was, that as soon as she assumed a recumbent position she obtained relief. When I saw she had lost seven teeth, as a forlorn hope I recommended her taking gelsemium 15 minims and aconite 5 minims alternately. This was seven years ago, and she has been relieved from pain ever since. The other case, that of a

lady who has since died, was of a similar character. She was suffering almost as acutely and had distortion of the features. I could only discover a very small abrasion on the canine tooth. I removed it, crushed it, and examined the pulp under the microscope, and found that the whole mass was an agglomeration of calcified bodies. She was relieved for a time, but the pain returned as badly as before, and when I last heard of her, she was suffering so much that she was unable to come to London.

Mr. Storer Bennett: With regard to the question, Do we know of any cases of trophic lesions to distant parts distinctly referable to the teeth? I have a very distant recollection of trophic lesion in a girl, the lesion being an ulcer of the cornea of many months' duration. It had been treated in the ordinary way by several surgeons without any success whatever. The case was seen by Mr. Nunn, of the Middlesex Hospital, who sent her to me. He said he was quite sure that on the eruption of the canine tooth the trouble would disappear. As a matter of fact, when the canine tooth in the course of time was erupted, the ulcer of the cornea did disappear.

You mentioned, sir, the cases when wrong treatment of injured nerves produces temporary relief. I have in my recollection the case of a patient 40 years of age, looking many years older, who was perfectly edentulous in the upper jaw; all the teeth were taken out for supposed neuralgia, but when they were all taken out it was obvious that the pain was not due to the teeth. It was then suggested that something in the bone might be the cause, and the bone was drilled into, but without any good result. Then Mr. Henry Morris cut down upon the infra-orbital nerve and stretched it. The pain returning, he next cut into the infra-orbital canal and removed the nerve up to the fissure. On this nerve he discovered some little bodies, similar to those drawn by Professor Horsley, which seemed distinctly to be some little fibrous nodules. The operation gave relief.

Professor V. Horsley, replying, said, with respect to the undoubted fact of operation upon the extremity of the nerve producing relief for the time, and yet not getting at the root of the mischief: Well, it is obvious, theoretically, we may have been creating violent counter-irritation at the end of the nerve, and I should think that the category of cases belongs to Professor Gros's instances relieved by drilling. Then, again, of course it may be, as Mr. Hutchinson suggested, in these cases the mischief begins peripherally, and extending towards the centre you may have a creeping peripheral neuritis, and therefore there is no reason at all why it should not affect the branches of the fifth nerve. However, that is one point to be solved.

You said, sir, we might have trophic lesions absent in some severe cases. It was so in my own. To that I have no explanation to offer. It is of great interest to me to understand that the pain may be severe for a few minutes, then suddenly disappear, then occur again in an epileptiform manner. This complicated the diagnosis considerably. Mr. Turner also referred to peripheral disease of the teeth where the interior of the canal was affected, and of course removal cured the patient.

Then, as regards the point raised with reference to the wisdom teeth, that is a matter upon which I came to ask rather than give information. Then the cases of Mr. Stocken are extremely valuable, and it is of great interest to me to know that such cases, and after so long a period as nine years' suffering, can be treated by drugs; it gives one great hope that operation may become unnecessary. With respect to Mr. Storer Bennett's case of trophic ulcer of the cornea, I am aware of many cases published of disturbances of parts, not necessarily trophic, produced by peripheral irritation. The question I was really asking with regard to cases of trophic changes was, under what circumstances do these occur most commonly? If you have a case of severe neuralgia, so-called neuralgia, if you have very distinct disease, do you have trophic disturbances? I suspect it would be answered in the negative.

Then again, with reference to painful spots, the pain is referred to the periphery. I know there is no very great difference between slight tenderness and distinctly local pain that you get in these cases which is apparently due to the condition along the branches of the nerve.

Well now, with regard to the changes in the nerves I have removed, they all present great overgrowth of epineurium. The course of the nerve in the bone I believe to be the fountain of the mischief, and it was for that purpose I proposed that the nerve should be divided above the bone.

As to the discussion of the possible pathology, I do not know anything, and, as I said before, it is upon that point I seek information.

As regards the easy diagnosis of so-called tender teeth, I am not quite sure on that point, because a gentleman consulted me who had a first bicuspid removed in the lower jaw which made the pain worse in the next tooth. I think, unless we adopt the theory of a creeping neuritis, we cannot admit that this was a typical case of disease beginning in the periphery. I think, sir, that that concludes the remarks that I would venture to make; as I said before, I did not come here to teach, but to learn. I would just add one word, viz., that these operations in general are not so severe as they sound. Here, sir, is a photograph of my second case, the removal of the whole division of the fifth nerve, taken five days after the operation. I admit, of course, that if proper precautions were not taken these operations would be very formidable, but with the teaching of Sir Joseph Lister and others, I do not think we need fear very much.—*The London Dental Record.*

ARTICLE II.

THE IMPORTANCE OF A LIBERAL PROFESSIONAL EDUCATION IN THE PRACTICE OF DENTAL AND ORAL SURGERY.

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BY DR. G. FRANK LYDSTON, M. D., CHICAGO.

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(An abstract of a paper read before the Section on Oral and Dental Surgery of the American Medical Association, June 7th, 1987.)

Having been invited to address you upon some topic of a character suitable for presentation to progressive dentists and oral surgeons, I have thought it advisable to present to you my reasons for believing that the interests of the general practitioner and dentist, have much in common. Personally, I am greatly interested in dentistry, as a department of the great science and art of general medicine, and in my association with dentists I have derived both social and professional benefit, and have come to regard them as the co-laborers of their medical and surgical brethren in the field of science.

It was long urged by the members of my own department of science, that the normal position of the dentist is that of a species of tooth-carpenter—a mere mechanical drawer of teeth and plugger of real or imaginary cavities; and it is a serious reflection upon the liberality of the medical profession that many of its members accord much the same position to the dentist of to-day.

In not a few instances the modern surgeon had indignantly resented the claims of dentistry as a surgical specialty, apparently forgetting in his illiberality that it was only about a hundred years ago that the general surgeon himself began to rise above the level of the barber and the monkish cutter for "the stone." Had there not been a Hunter, who arose like an apostle of scientific light, and began his physio-chirurgical experiments years in advance

of his day and age, the present status of general surgery might be most humiliating to contemplate.

It is an amusing fact that in some of our latter day illustrations of the crudity of the surgery of a past generation, dentistry and general surgery are most intimately associated. How consoling and gratifying to the conceit of ye pompous surgeon of to-day is the legend still to be occasionally seen surmounting a barber pole: "Bleeding, leeching, cupping, blistering, tooth-drawing and hair cutting done here."

Wedded centuries ago, Surgery and Dentistry drifted away from the barber, and, unfortunately, also from each other, *pari passu* with scientific progress. In these modern times we are striving to reunite the two branches of healing by a common interest in science, and upon the basis of a division of labor, i. e., specialism. It is perhaps fortunate for all concerned that an occasional barber exists who is capable of demonstrating to us the common and humble origin of both specialties.

There has been a striking interdependence of most of the modern improvements in dental and surgical science. Although not generally so accepted, John Hunter's famous experiment of grafting the spur of a chicken cock upon its comb really foreshadowed not only the operation of skin grafting, but that of tooth grafting and tooth implantation, a procedure which has recently been brought so prominently before the dental profession by Dr. Younger. It is indeed singular that the operation of tooth transplantation and implantation was not earlier discovered, inasmuch as the various epithelial tissues and appendages are much alike in their manner of growth and development, and the growth of an implanted or transplanted tooth is hardly more remarkable than the phenomena attendant upon the attachment and growth of miliary skin grafts. That a tooth which has been apparently dead for a considerable time should grow after implantation is no more wonderful than the growth of skin grafts which have been



transplanted from the dead to the living body, I have myself succeeded in the transplantation of grafts from a corpse dead forty hours, to a healthy living ulcer. As an absolute verification of this, I have grafted the skin of a negro, dead nearly thirty-six hours, to the leg of a white man, and with success, the area of black skin resulting being quite conclusive. Another peculiar fact is that apparently effete epithelium scraped from the surface of the skin, and sprinkled over the granulations of a healthy ulcer, will result in the development of new little islets of skin and thus materially hasten cicatrization.

I understand that living teeth have been transferred from the human mouth to the comb of a cock, and thus preserved for future use, the teeth meantime absorbing nutriment from the circulation of the fowl. If this be practicable, the procedure brings dental surgery of to-day and the now famous experiment of the immortal Hunter very near each other. While my digression may seem irrelevant to some, I think that it is justified by this kinship between skin grafting and tooth grafting.

The histo-genetic power shown to exist in epithelial structures has been shown to exist in others. There seems to be a general law pervading all organic life, to the effect that the power of reproduction and repair of organized matter is in inverse ratio to its degree of differentiation. This holds true of cells as well as bodies completely organized. The star-fish may be dismembered, but it reproduces the lost segments. Smash the amæba, and we have as many new amæba as we have particles. Spiders, crabs, crawfishes, and some other animals speedily reproduce lost limbs and other appendages. So we see in cells, that epithelial cells are possessed of great vitality, and not only grow themselves, but excite the property of rapid growth in any cell with which they may come in contact. Degraded epithelial cells grow more rapidly than the more perfect forms, as is evidenced by those sad cases of carcinoma and sarcoma so often met with. Connective tissue



cells have an innate power of proliferation and propensity for differentiation upon which all processes of repair and growth of all kinds, physiological or pathological, depend. Irritate the tissues, and these propensities are forthwith brought into action. The labors of the general surgeon showed us long ago that bone could be reproduced from periosteum, and that most daring operator, the late James R. Wood, showed in his noted case of phosphorus necrosis that the entire lower jaw might be reproduced after its excision.

The dental and oral surgeon has not been at all backward in taking advantage of this extraordinary reproductive power of the maxillary periosteum, and my progressive friend, Dr. J. S. Marshall, has recently operated upon the maxillary in a manner which would put some of our general surgeons to the blush. Such operations do not savor very strongly of the tooth-pulling mechanic.

The dentist has not only shown himself to be capable of assimilating the discoveries of surgical science, but he has contributed materially to the art of surgery. To the dentist we owe the discovery of anæsthesia, the greatest boon ever conferred upon suffering humanity.

Much of our knowledge of that valuable drug, the peroxide of hydrogen, has been due to its use in the practice of dentistry.

Even the field of microscopy has been invaded by the dental scientist. Much of our present knowledge of the forms and growth of micro-organisms is due to the researches of that indefatigable worker, Dr. G. V. Black; and it would be well if every physician would study the results of this gentleman's labors in his chosen field.

We have not only come to regard dentistry as a special branch of the healing art, but we are forced to acknowledge that it is a most important branch.

In the words of the late Professor Gross, "Dentistry is the most important specialty in medicine. Many people come into the world and go out of it who never require the

services of other specialists, but no child is born that does not sooner or later require the services of the dentist." The words of the Nestor of American Surgery are excellent testimony in favor of dentistry as a necessary specialty, and it would be well if this truth were more generally appreciated.

The classification of dentistry as a specialty of general surgery is justified to a greater degree than in the case of any other specialty. As my lamented friend, the late Professor Van Buren, used to define it, "Surgery is that branch of the healing art which takes charge of all those diseases and injuries which require in their management the use of instruments and mechanical appliances, operations, or especial manual dexterity." To no other specialty does this definition so aptly apply as to dentistry, and I can scarcely conceive of a single dental or oral operation that does not require all of the qualifications mentioned. This eminent surgeon said further, with reference to general surgery as a specialty of medical science, "that a specialty should be the outgrowth of a liberal professional education;" in short, that a true specialist should be a man who knows "something of everything, and everything of something." Every specialty should be evolved from the general field of scientific labor, and its selection should be modified by experience, the law of division of labor, and special adaptation. In the present paper we have but to do with the dental specialist, and it is to him in particular that we at present apply this general rule.

The dentist is nowadays expected to be a fair anatomist and it should no longer be considered reprehensible for him to know more than the anatomy of the teeth and jaws. He may never realize the fact that he has an ileo-cæcal valve, or a vermitorm appendix, but a little enlightenment upon the subject will not render him less capable of skillful dental work; and when an obstreperous cherry pit lodges in his appendix, he may console himself in the fact that he knows pretty nearly where the trouble is located.

He is, of course, expected to know all about the structure and development of the teeth and jaws, the muscular mechanics in their movements, and their nerves and vascular supply, in order that he may occasionally discourse learnedly upon centres of classification, intermaxillary bones and synchondroses *ad infinitum*, as does my enthusiastic friend Dr. Talbot, when discussing his hobby "dental irregularities." The necessity for a knowledge of physiology is self-evident, the embryonal development and eruption of the teeth being of especial importance. A knowledge of the physiological secretions is a necessity, else how could the effects upon the teeth of the morbid conditions affecting them be studied? In the study of normal and morbid secretions a knowledge of chemistry is necessarily involved. Chemistry and metallurgy are further necessary, in order that the student of dental science may become familiar with the various materials and implements with which he works and the composition of the teeth. The dentist requires a certain amount of therapeutical and pharmaceutical information. The dental *materia medica* is becoming an important factor in dental education.

Perhaps the most important branch in dental education is pathology and pathological anatomy, particularly the division of the subject which has been termed "surgical pathology." The amount of general medical and surgical knowledge requisite to a clear understanding of the morbid changes which are under the attention of the dentist is far greater than is supposed by those narrow-minded individuals who regard dentistry as a species of tooth carpentry. The dentist must thoroughly understand the forms, causes and treatment of caries and necrosis of the teeth and jaws, a knowledge of which will open up to him a vast field of general surgical information. If he understands maxillary necrosis he will also understand the same disease as affecting other bones. He should pay considerable attention to syphilis and its treatment, as causes of caries and necrosis of the teeth and jaws, and inflammation or ulceration of

the mucous membrane of the mouth. Being familiar with such lesions, he must necessarily know much of the mucous inflammation and ulceration in other situations. He must learn all about the causes, anatomy, and treatment of suppurative inflammation about the jaws, and when he has done so he will have mastered the most important portion of general surgery.

Neoplasmata, their causes, method of formation and structure, should be familiar to him, for he may be confronted at any time with epulis cancer of the jaws, extosed or other conditions requiring surgical skill for their relief or cure. He should know all the important details regarding fractures, their method of union, and mechanical and therapeutical treatment.

The necessity of a thorough understanding of the general principles of medicine, particularly as regards the causes, results, and therapeutics of perversions of general nutrition, can scarcely be overestimated. This is most aptly illustrated in those conditions of malnutrition which result from syphilis, rickets, and struma, diseases which react most injuriously upon the teeth and jaws. A fair ability to differentiate the various oral lesions of syphilis from benignant affections, and from each other, is requisite. As my views upon this subject were presented before your section at the St. Louis meeting of last year, it is unnecessary at this time to consider the topic in detail, although I consider it one of the most important that can be brought before the progressive dentist.

It is a long way around from defective molars to perverted nutrition, but from imperfect mastication may result imperfect digestion and assimilation, and from the latter condition there may occur such a strain upon the liver and kidneys that actual structural diseases result. Gout is a dyscrasic affection, which may be expected from such conditions of perverted physiology. Conversely, as has been already indicated, morbid appearances of the teeth and gums may indicate certain morbid conditions of the general

system, which bear a casual relation to the dental imperfections. As illustrations may be mentioned syphilis, rickets, mercurialism, struma, and scurvy.

A subject with which every dentist should be more or less familiar is the serious affection known as septicæmia, or preferably septæmia or blood poisoning.

Instances of fatal blood poisoning have been known to follow so simple an affection as alveolar abscess, as well as more grave forms of suppurative inflammation about the jaws and teeth. Mild cases are more frequent than is generally supposed. Only a short time since I met with a case of mild septæmia following an alveolar abscess in one of my personal friends. In this instance the dentist in attendance, and a physician to whom he referred the patient prior to his visit to me, failed to recognize the real condition present.

In connection with this condition of sepsis the dentist may simplify this study of the subject if he will remember that septicæmia and pyæmia so called, are but phases of the same constitutional condition, and are due to the local absorption and subsequent general dissemination of the same septic material. The difference between the two phases of disease are those of degree, not kind, and they depend, not upon the existence of a different *materies morbi*, but upon: 1st, the primary intensity of the poison; 2d, the facility with which it is absorbed; 3d, the quantity absorbed and the duration of the period of its absorption; 4th, the rapidity of its elimination; 5th, and the most important consideration of all, the inherent vitality or resisting power of the patient.

By studying the subject of blood poisoning in this manner, it may be reduced to a simple and logical basis. As presented in most of the works on surgery, septicæmia and its various phases constitute a subject so confusing that very few students ever succeed in mastering its intricacies. The dental specialist should not only familiarize himself with the clinical features of septic infection, but he



should study the results obtained by the investigations of Pasteur, which foreshadowed all of our knowledge of septic processes. He should also understand the principles laid down by Lister in his system of antiseptic treatment, which involves all of those cardinal principles which govern us in the prophylaxis and treatment of blood infection from suppurating wounds.

Look where we may in the chosen field of the dentist, and we are confronted by intricate problems of a general and most diverse surgical character. Who among our general surgeons can say after such a survey of the science and art of dental and oral surgery, that the skillful and studious practitioner of this specialty is not a surgical scientist and a co-laborer in that beneficent art whose progress has been illuminated by Hunter, Bilbroth, Paget, Parn, Mott, Van Buren, Wood, and others, whose names, though equally famous, would fill my paper to overflowing. I maintain that no man of even average intelligence can become a pretty thorough dentist without at the same time becoming a pretty good physician and surgeon. He should, by all means, possess the general knowledge of the average practitioner of general medicine, and in addition, he should have the general knowledge and mechanical talent necessary to treat the peculiar class of cases brought before him as a surgical specialist. There is a special necessity for general medical knowledge in a certain direction, to which I desire to call attention. Every educated dentist is now supposed to familiarize himself with anæsthetics and their method of administration, but, unfortunately, he is not expected to know very much about those conditions which contra-indicate their use. There are various morbid conditions of the heart, lungs and kidneys, which the merest tyro might discover by a little attention, and which I fear often escapes the attention of the dentist. I believe that no one should ever give an anæsthetic who is not qualified to make a fairly accurate estimate of the condition of the heart, lungs and kidneys; yet this is often done in the

dentist's chair. Much can be determined by careful observation of the patient's general appearance. I recall several cases in point: A friend of mine and a competent dentist undertook the administration of chloroform for the purpose of extracting a carious tooth. He was assisted by a lady physician who considered herself well qualified. The affair did not concern me, but as I had an adjoining office I happened to get a glimpse of the patient's face, and decided to remain within call. Hardly had the anæsthetic fairly begun its work before the stertorous breathing of the patient alarmed my friend so that he called me to his assistance. It was high time, for if ever a patient was on the verge of death from asphyxia and heart paralysis, this one was. I succeeded in resuscitating her, but she subsequently passed through an attack of renal and pulmonary congestion that well nigh ended her life. The puffy eyelids, red face, and feeble circulation of this patient should have warned my friend of the danger of vasa motor paresis to which this patient was exposed, and should have suggested an urinalysis which would have developed the existence of chronic Bright's disease. I have since seen a similar case from nitrous oxide. In this case also, there was the sequence of acute pulmonary congestion, but in a patient who was phthisical. There is an old adage to the effect that "it is a poor rule that does not work both ways." The doctor should have some special dental knowledge. Some time ago I was consulted by a young man with a suppurative tumor of the jaw. He had been treated for some weeks by an aspiring surgeon who pronounced the case one of "actinomycosis" and proposed to operate upon it. I discovered that the tumor was a phlegmonous inflammation secondary to a carious tooth, and which had existed for eight months. Dr. Austin, who saw the case with me, extracted the tooth to which I attributed the trouble, and in two weeks without further treatment, the case was well. Some of my friends who are present will recall this case, and the controversy in which I became

involved on account of my inability to diagnose "the second case of actinomycosis ever seen in America."

As an offset to this case, I once saw a case which a dentist referred to me, for the purpose of having a tumor of the gum removed. I found a spongy, vascular growth the size of a hickory nut protruding upon the anterior and posterior surfaces of the lower incisor teeth. On examination I discovered the tumor to be a mass of spongy and exuberant granulations due to the irritation produced by a mass of tartar about the incisors. Removal of the tartar with the application of nitrate of silver to the tumor cured the case completely.

A fact recently determined, and one which is of great importance, is the association of neuralgias of various kinds, and perturbations of sight and hearing, with carious teeth. This necessitates a certain amount of neurological knowledge on the part of the dentist.

In my presentation of the claims of dentistry as a surgical specialty, I do not wish to be understood as advocating the presumption of the rights and duties of the general practitioner by the dentist. A true specialist should render unto Cæsar those things which are Cæsar's, i. e., he must on proper occasions consult the general practitioner. I know of one individual who apparently attempts to monopolize the entire field of medicine and surgery. So many and varied are the cases which he collects for the gaze of the admiring public, that his office strongly reminds one of a dime museum representation of the Chamber of horrors. Until quite recently this professional anomaly occupied the position of examiner to a life insurance organization. Imagine the sudden metamorphosis of the filler of teeth into the analyst of the urine. Versatility of talents is an admirable quality, but under certain circumstances its exhibition may be in decided violation of decency and good taste, to say nothing of the question of "loaves and fishes."

In passing I will merely allude to the necessity for a knowledge of some of the natural sequences of pregnancy.



The better class of dentists are of course familiar with the fact that dental operations are not always attended by good results, and are sometimes absolutely dangerous in the pregnant state. This fact, although disputed by some, is of sufficient importance to merit most serious consideration. Even if disputed, the patient and not the operation, should have the benefit of the doubt.

To show, in conclusion, that I am not alone in my desire to see the profession of dentistry recognized as a part of general medicine and surgery, I may cite the existence of the dental section of the American Medical Association, present here to-day. More pertinent still, is the fact of the establishment of a dental section in the coming International Medical Congress. It is to be hoped that the dental profession will give this department of the congress their most earnest and harmonious support, for, if it be successful, it will give the claims of the dental profession to surgical specialism an impetus that nothing else would afford.—*Dental Register*.

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### ARTICLE III.

## THE PREPARATION OF TISSUES FOR EXAMINATION WITH THE MICROSCOPE WITH SPECIAL REFERENCE TO THE MICROSCOPICAL EXAMINATION OF THE TEETH.

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BY S. FLEXNER, PH. G., OF LOUISVILLE.

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(Read before the Kentucky State Dental Society, June, 1887)

All objects require some preparation before they can be profitably examined with the microscope. The treat-

ment necessary to secure satisfactory results varies within very wide limits, depending on the structure with which we are dealing and the result which it is desired to attain. In every case the method of preparation is based on a knowledge of the structure of the object intended for examination and the change which it undergoes when brought into contact with reagents whose properties are understood. In the application of reagents the greatest care and precision should always be observed lest we irreparably impair what otherwise may have been a valuable specimen. The intelligent and scientific preparation of tissues is therefore of the first importance, and I will endeavor to present in as short space as practicable those methods which are generally recognized as producing the best results, and which are endorsed by the most eminent microscopists. Objects intended for viewing with the microscope are mounted in one of two ways, as transparent objects or as opaque objects. The first is the method commonly applied to histological and pathological specimens, as it affords a view of the entire section, while the latter exhibits only the structure of the surface. To this end the first requisite is to secure a portion of the tissue so thin that light is readily transmitted through it and its structure discernible. This is accomplished either by teasing or section-cutting. By the first method the elements of the tissue separated under glycerine by needles are mounted in the same fluid and subjected to examination, while by the second thin even sections are cut by means of a razor, the tissue having been previously prepared to fit it for this operation. Teasing is applicable to fresh material, while section cutting is not, unless indeed one is possessed of a freezing microtome.

As it is not always convenient to prepare and examine specimens as they are received, the preservation of them for future examination and study is of an important matter. As this is involved in and elucidated under the subject of hardening specimens, it will be dismissed here. Of the processes for preparing tissues for examination section cut-

ting is to be recommended. When it is desired not so much to preserve specimens as to make rapid diagnoses, teasing will answer a good purpose, but the patience requisite to secure satisfactory results, and the disarrangement of the parts of the structure which inevitably ensues are considerable limitation to its employment. Therefore the cutting of the sections is preferable, particularly when it is desirable to preserve the specimens.

Ordinarily, indeed in every case where the freezing microtome is not employed, the tissue (if it is soft) has first to be hardened. This is accomplished by means of agents which act by coagulating the albumen and gelatine, present in the tissues, and by the abstraction of water. The substances most commonly employed are alcohol, Muller's fluid, chromic, acid and glycerine.

The desideratum in the hardening of tissues is to obtain the desired result with as little shrinkage as possible. The reason for this is evident, and should ever be in mind when attending to this part of the process. Hardening should be done slowly and with precision. No one method can be applied to all tissues, but each agent has its special applications. I will enumerate them in the order in which they are generally employed.

1st. Alcohol hardens by coagulating albumen and gelatine and abstracting water. Tissue to be hardened in it, should be cut in pieces a cubic inch in size and passed through successive solutions at intervals of three days having different strengths as follows; 45 3, 60 3, 80 3, 95 3. Almost all kinds of tissue may be hardened in alcohol, the exceptions being embryonic tissue, myxomatta, and callow tumors.

2d. Muller's fluid hardens by coagulating albumen and gelatine, but abstracting but little water. Causing little or no shrinkage, it is of great applicability, and its use is attended with little risk to the tissues. It acts slowly and should be renewed often. The pieces immersed in it should be of the size of those hardened in alcohol. If at the end of

four or six weeks the specimen is not sufficiently hardened, it should be transferred through the different strengths of alcohol enumerated before, to 95 alcohol for completion. The time for immersion in each strength is to be much shortened. Muller's fluid is prepared as follows.; Bichromate potash, two parts; sulphate sodium, one part; water, one hundred parts; mix and dissolve.

3d. Chromic acid is used in solutions containing  $\frac{1}{2}$  percent. It acts like Muller's fluid, but more energetically. This solution must be renewed every few days, but it will do in days what Muller's fluid takes weeks to accomplish.

4th. Glycerine acts wholly by attracting water, and should be diluted at first, the pieces immersed being small. Thin sections of the hardened tissue are made by holding the tissue in the hand and cutting with a razor (free hand sections) and imbedding in paraffine or wax, and cutting with a microtome (mechanical sections). The staining of the sections follows the cutting. Probably no greater progress has been made in any department of biological science than in the staining of tissue for the purpose of differentiation. Staining depends on the affinity of different elements of one structure for special stains or different amounts of one stain. A given tissue may be made to take one stain in such a way as to show the different parts by the degree to which each is stained; or it may be stained with reference to bringing out one part with one color and other parts with other colors—double and treble staining. A great variety of stains are in use, of which I will mention a few: Ammonia carmine, alum carmine, borax carmine, picro carmine, indigo carmine, hæmatoxylon, and the aniline stains in general. 1st. The ammonia carmine, which has given the best results in my hands, is Beale's. It is made as follows: Carmine, 10 grs.; strong water of ammonia,  $\frac{1}{2}$  drachm; glycerine and water, of each 2 ounces; alcohol  $\frac{1}{2}$  ounce. Dissolve the carmine in the ammonia by the aid of heat and leave the solution exposed for one hour for the excess of ammonia to evaporate, then add the other ingredients and filter.

2d. Alum carmine, Grenacher's formula, is as follows: To 100 parts of 5 percent solution of pure alum add 1 part of carmine; boil for twenty minutes; allow to cool and filter.

3d. Borax carmine. Take of carmine, 30 grains; borax, 2 drachms; distilled water, 4 ounces; mix and decant; do not filter. Stain for a few minutes and wash in muriatic acid 1 part, alcohol 20 parts, till the section assumes a bright rose tint.

4th. Picro carmine, Ranvier's formula, is satisfactory. It is as follows: Rub 1 gramme carmine with 10 c. c. of distilled water, and add 3 c. c. of aq. ammonia. Add to this 200 c. c. of a cold saturated solution of picric acid. Evaporate slowly in a water bath to one-third at a low temperature. This is a double stain.

5th. Indigo carmine. This stain is used in conjunction with borax carmine for double staining.

6th. Logwood is very useful in many cases. It brings out nuclei quite as well as carmine, and makes a valuable contrast stain. With picro carmine and rosin it double stains effectively.

7th. Aniline stains. These are various and very beautiful. They do not differentiate as well as some mentioned, but are useful in special cases. It remains to mention nitrate silver, chloride gold, and osmic acid. These are only used in special cases, and need not be dwelt on here.

To stain successfully, practice is required. Little excepting general rules can be obtained from books. A few failures may be the means of making the whole procedure intelligible if the causes are carefully sought out.

The mounting of the section is next to be accomplished. Some workers regard this step as indifferent, at least in point of importance. Perhaps this is one reason that so many cabinets on examination are found to contain a great number, if not a predominating number, of poor and useless specimens. For my part I take great pride



in this operation. The mounting fluids are reducible into resinous and aqueous media. In this latter division I include glycerine. The type of the former is Canada Balsam. This is variously prepared for use. It may be employed as it is or concentrated—that is, with its oil driven off and dissolved in benzole, xylol, alcohol, chloroform, etc. For usual operations I prefer the Benzole Balsam. It has the merit of drying quite rapidly and of being easily soluble in benzine. This I consider important, as the cleaning of the slide can be done with this cheap agent. Glycerine is an excellent mounting medium, and is preferred by such an eminent microcopist as Lionel Beale. Mounts in glycerine have to be cemented, as the glycerine does not dry, and is apt to absorb moisture. Further, this is essential to prevent the cover glass from being displaced. The use of round covers makes this easy if one is possessed of a turntable. Gold size I find admirable for this purpose. It dries by oxidation, being insoluble, and is therefore not acted on by the glycerine, even after a long time. Mixtures of gum, water and glycerine have been recommended as self-drying fluids. I have had so little experience with them that I am not prepared to say with what success they may be used. Before mounting in balsam clarification of the section is necessary. This is done usually with oil of cloves. If Benzole Balsam is used the clarifying may be done with benzole. Glycerine mounts become clear through the actions of the medium itself.

#### THE MICROSCOPICAL EXAMINATION OF TEETH.

Teeth resembling bone in many particulars require much the same treatment before they are ready for microscopical examination. To examine them in situ it is best to take the lower jaw of some small animal, as a rat or mole, and decalcify it with chromic and hydrochloric acids. After the lime salts are washed out it is to be cut into sections and the sections stained in picro carmine and logwood

and mounted in Canada Balsam. To prepare sections of non-decalcified teeth sawing and grinding is the accepted method. Much time may be saved in this operation if we provide ourselves with a couple of emery wheels, one moderately coarse and one very fine, and use a lathe. For vertical sections the tooth is sawed into halves and the flat edges smoothed on the fine wheel. They are then cemented to a glass slide with Canada balsam and the grinding done first with the coarse, and then with the fine wheel, until the desired thinness is obtained. Transverse sections are sawed and finished in the same general way as vertical, only a greater number can be made from one tooth. By warming the balsam the sections are removed and are then ready for permanent mounting. Dentine—the components are a firm matrix, dentinal canals, and dentinal fibres. To see the fibres magnifying powers of 500 to 1,000 diameters are required. The dentinal sheaths the lining of the tubules can best be seen in cross sections, when they appear as delicate yellowish rings, in the interior of which the transverse section of the dentinal fibre is perceptible in the form of a minute dark spot.

The dentinal tubules are the best shown in sections dried in air. They then appear in the form of strongly defined very dark tubules or lines. Concentrated nitric acid brings out the dentinal canals. The fibres easily stained with carmine.

Enamel.—If young teeth are examined at the stage when they are capable of being cut with the knife the enamel prism may be clearly observed. Transverse sections exhibit a delicate net work with six sided areas. In the adult the enamel prisms are demonstrable after treatment first with dilute hydrochloric acid, afterwards with sulphuric acid.

The cuticula.—The structure of this is demonstrated after its removal from young teeth with hydrochloric acid just as they are perforating the gum. It is stained with nitrate of silver.

Cement.—In its chemical and microscopical character it is closely allied to bone. It calls for the same treatment.

The Pulp.—In many respects it recalls in structure the mucous tissue of old umbilical cord. Consisting of finely fibrous connected tissues liberally supplied with cells, it is treated similarly to soft structures from other parts. Its cavernous appearance is given it by the capillary vessels it contains. I hope with the assistance of Dr. Hooper, to exhibit to you to-night specimens which will illustrate the different processes mentioned in this paper. In this connection I desire to express my thanks to Dr. Hooper for his valuable and cordial assistance.—*Dental Register*.

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#### ARTICLE IV.

### ERYTHROXYLON COCA AND ITS ALKALOID— COCAINE.

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BY W. E. BAXTER, OWENTON, KY.

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[Read before the Kentucky State Dental Society, June, 1887.]

The coca leaf is the great source of comfort and enjoyment to the Peruvian Indian; it is to him what betel is to the Hindoo, and tobacco to the rest of mankind. But the other stimulants do not possess the invigorating effects that the coca leaf produces. The Peruvian Indians have used this leaf from the most ancient times, and still look upon it with feelings of veneration and superstition. It was sacrificed to the sun in the time of the Incas, the high priest chewing the leaf during the ceremony; and before the arrival of the Spaniards it was used instead of money. After the conquest it was proposed to proscribe its use, because it had been used in the ancient superstitious rites. In 1569 the second Council of Lima condemned the use of coca in South America, because it was a "useless and



pernicious leaf," and on account of the belief stated to be entertained by the Indians that the habit of chewing coca gave them strength, "which is an illusion of the devil."

In speaking of the strength the coca gives to those who chew it, Carcilasso de la Vega relates the following anecdote: "I remember a story which I heard in my native land of Peru, of a gentleman of rank and honor, named Rodrigo Pantoja, who traveling from Cuzco to Lima met a poor Spaniard who was going on foot with a little girl aged two years on his back. The man was known to Pantoja, and they thus conversed: 'Why do you go laden thus?' said the knight. The poor man answered that he was unable to hire an Indian to carry the child, and for that reason carried it himself. While he spoke Pantoja looked in his mouth and saw that it was full of coca; and as the Spaniards abominate all that the Indians eat and drink, as though it savored of idolatry, particularly the chewing of coca which seems to them a low and vile habit, he said: 'It may be as you say, but why do you eat coca, like an Indian, a thing so hateful to Spaniards?' The man answered: 'In truth, my lord, I detest it as much as any one, but necessity obliges me to imitate the Indians and keep coca in my mouth, for I would have you to know that if I did not do so I could not carry this burden, while the coca gives me sufficient strength to endure the fatigue.' Pantoja was astonished to hear this, and told the story wherever he went, and from that time credit was given to the Indians for using coca from necessity, and not from gluttony.

Cocaine, the alkaloid of erythroxylon coca, was first discovered by Hieman in 1860. Hieman prepared cocaine by exhausting coca leaves with 85 per cent. of alcohol, containing 1-50 of sulphuric acid, supersaturating the alcoholic solution with lime, then neutralizing carefully with dilute sulphuric acid, separating the precipitated sulphate of calcium and distilling off the alcohol. The residuary liquid is supersaturated with soda, and then shaken repeatedly with ether, which dissolves out the cocaine. On evaporation

ing the ethereal solution cocaine remains behind in an amorphous condition, but soon becomes crystalline.

According to Merck, coca contains between 1-5 and 1-50 per cent. of cocaine. The average effective dose of this hydrochlorate in man is stated to be  $\frac{3}{4}$  of a grain.

Schroff, who made the first experiments with cocaine in 1862, observed that it caused fluctuations in the respirations and pulse, and produced mydriasis. Frommuller, in 1863, found that it had but little effect, in man, in doses of 2-5 to  $\frac{1}{2}$  grain, and in a case of attempted suicide 24 grains did not even produce serious results. The cocaine used in those days must have been very impure.

Since I began to use cocaine for extracting, in January, 1885, I have had no occasion to use any other preparation of muriate cocaine than Park, Davis & Co.'s 4 per cent. solution, as I have met with uniform results with this preparation in lessening pain, with few exceptions, since I learned how and where to insert the point of the hypodermic needle; and all depends on this one thing to have good results.

In this time I have used altogether about 150 drachms of the 4 per cent. solution, and the greatest quantity used hypodermically for one person at one time was  $1\frac{1}{2}$  drachms, 4 per cent. This was for Mrs. Wm. G. C., of Dallasburg, who was unable at the time to come to the office; hence I was sent for to do the extracting (28 teeth in all) at her home. The lady had suffered greatly with her teeth, the mouth being in a very bad condition, most of the teeth badly abscessed with calcareous deposits on their necks, gums badly swollen and hypersensitive from stagnant circulation. The tissue surrounding the teeth was injected with cocaine until it was thoroughly *bleached*; and when this occurs you may know that the cocaine is of good strength, and has had the proper effect, and you can extract at once. These teeth were taken out without the slightest pain, and although the patient being of a hemorrhagic diathesis, and had head trouble before, from great

flow of blood from extracting, we had no trouble whatever from undue bleeding, as the cocaine undoubtedly had a beneficial effect in this direction, and I have often noticed that the flow of blood is not so great when it is used, as it seems to drive the blood from the parts in which it is injected.

Great care should be taken that none of the cocaine should get in the mouth and be swallowed. Cocaine can be taken in the stomach by some without bad results, which I have observed that one drop taken on the tongue and swallowed has caused violent retching, the nausea lasting from one to two hours. This, however, can be relieved almost instantly by dr. doses of Hoffman's anodyne in a large amount of water. This can be repeated at intervals of five minutes until sickness is relieved, one dose, though generally does the work.

Miss Bettie T., aged 16, came to the office on the 5th of last March to have a left superior bicuspid extracted. The patient was predisposed to heart trouble, her mother dropping dead while apparently enjoying the best of health. Miss T. was of a highly nervous temperament. She had suffered with this tooth for some time, and being a chlorotic patient, with this and overwork in the school room she had become much debilitated. Another indication of feebleness and nervousness was the tremulous moist and flabby tongue. I apprehended trouble and watched the patient closely. I injected 10 minims in the gum surrounding the tooth, the reddened gum turning white, whereupon the tooth was taken out, and as the patient told me afterwards without the slightest pain. As soon as the tooth was out the patient "collapsed," pulse and breath ceased. Artificial respiration with nitrate of amyl to the nostrils was resorted to with good results, the patient remaining in a semi-conscious state. She was placed in a recumbent position; there was then a rush of blood to the head; the extremities became cold and numb. The blood would at times leave the head, the patient stop breathing, the jaw become rigid.

whereupon artificial respiration would be used, and when the patient would come to again she would beg to let her go to sleep. This should never be allowed. Patient complained of being sick at stomach, palpitation of heart was noticeable, at times, the breathing difficult with sense of suffocation, and then stupor with insensibility, and when the patient would partially rally there would be agitation of limbs and whole body. Hoffman's anodyne, well known as a diffusible stimulant, anodyne and antispasmodic, was given in drachm doses every five minutes. After the first dose there was a noticeable change in the patient's condition; the nausea disappeared, the breathing and pulse became more regular, and after the third dose she was able to leave the office in seemingly better condition than when she came in.

In this case we have several indications pointing to hysteria, and as the patient had a similar *sceance* before coming having a tooth extracted without an anæsthetic, I am led to believe that the trouble was caused by cocaine. I could cite a number of cases in which I have had trouble with patients of a highly nervous temperament without using anæsthetics, and afterwards had the most flattering results from the use of cocaine.

We all know the pain attendant on applying the rubber dam over deep seated cavities, whose margins extend beneath the gums, and especially if the gums are in an unhealthy condition. I now make this operation painless by first *bleaching* the surrounding gum tissue with cocaine, after which the rubber dam, separators, matrices, etc., can be applied with all ease. The addition of muriate of morphia to muriate of cocaine hastens as well as prolongs the anæsthetic effect of cocaine. Add one grain of muriate of morphia to one drachm of distilled water, and this to one dram of four per cent. solution muriate cocaine; 20 drops of this gives the ordinary dose of morphia, one-sixth of a grain; inject 5 minims of this, etc.

I believe the operation of implantation can be made painless in this manner, although Dr. Younger says he has no confidence in cocaine, and this is because he never injected it, but only applied it to the gum surface, and of course it could not be taken up by the capillaries of the surrounding tissues to any great extent, and give the anæsthetic effect desired. As an obtunder for sensitive dentine it has not met with the success desired, but in the painless extirpation of pulps it has proved invaluable.

I am an advocate of the preservation of the natural teeth and their crownless roots, and "preach" (except Sundays) from this text almost every day in the year; but have yet to see the dentist who is so conscientious that he will take nearly all of his time in doing pauper practice. I usually suggest to these patients the advisability of saving their teeth, and then if they can't pay for the operation, and want them extracted, I do it in the easiest manner possible.

It is a wise provision of nature that great pain should attend the operation of extracting teeth—thus scaring the patient into taking better care of these organs—yet the day (as predicted) will never come, when the so-called "murderous forceps" will be laid aside, as we will find it advisable in many cases to extract and to have teeth extracted, and will be more loud in praise of that which will relieve the pain of this much dreaded operation.

Gentlemen, I have taken up too much of your time, and hope you will bear with me in this my first humble effort; and "you have been there yourself," probably, and know what it is to make your "first bow" on paper before such an intelligent and scientific body of men as the Kentucky State Dental Association.—*Dental Register*.

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## INTERNATIONAL MEDICAL CONGRESS.

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The preliminary work in all the departments of the Congress is progressing very satisfactorily. Of the preparation for the Dental Section we can speak more definitely.

Papers to be read before the section are rapidly coming into the hands of the Secretary, and are being arranged and prepared for proper presentation before the section. The various committees are giving active attention to their respective duties. A large number of the best members of the profession in this and foreign countries have engaged to give clinics in operative and surgical dentistry, and demonstrations in the prosthetic department; and doubtless the best talent of the world, in these branches, will be present. Opportunity will be afforded to see what the microscope has done for dentistry. A microscopic department is being provided for, in which will be presented the achievements of the microscope, by means of a large exhibit of preparations as well as the various methods of mounting objects for observation.

By the energy and perseverance of the local committee in Washington, large and ample accommodation in the way of rooms, &c., has been secured for all the work of the section. For this the committee will have the lasting gratitude of all concerned, and we hope even more substantial recognition than this. A very commodious room for the general meetings of the section has been secured in a church; all these rooms are in the same locality, or sufficiently so for convenience, and they are all within a reasonable distance of the principal hotels. The Arlington Hotel will be the headquarters for the Dental Section. It will be well for all who desire good quarters during the meeting to write and secure rooms at an early day. Some reduction of rates will be made by all the hotels. The committee on transportation have secured rates from several steamship lines as follows: from Liverpool to New York and return, \$80 to \$95, for first-class accommodations.

The various railroads of this country will doubtless give reduced rates to all who attend the Congress.—*Dental Register*.



CONDITIONS OF MEMBERSHIP IN THE NINTH  
INTERNATIONAL MEDICAL CONGRESS.

“Rule 1. The Congress will consist of such members of the regular medical profession as shall have registered and taken out their ticket of admission, and of such other scientific men as the Executive Committee of the Congress shall deem desirable to admit. The dues of membership for residents of the United States will be ten dollars (\$10). There will be no dues for members residing in other countries. Each member will be entitled to receive a copy of the *Transactions* of the Congress when published by the Executive Committee.

This rule, plainly defining the conditions for acquiring membership and participation in the approaching International Medical Congress, was adopted and published in English, French and German, in Circular No. 1, issued and widely distributed in both this country and Europe by the Executive Committee more than two years ago. It was repeated in Circular No. 2, issued in July, 1886, and also republished in most of the medical periodicals of this country. And yet we notice that some of our State and local medical societies have appointed *delegates* to the Congress, and we are often receiving letters making inquiries touching the same subject. Hence we have again quoted the rule, and wish to state explicitly that the doors of the International Medical Congress will be thrown open to all members of the regular medical profession, in all countries where such profession exists, who may apply to the Registration Committee in Washington, D. C., enter their names in full on the roll, and takes their tickets of admission. Those residing in this country must pay at the time of registering the \$10. From those residing in other countries no fee will be required.

In regard to the registration of educated dentists, about which there has been some question, it is sufficient to say that the same rule will be followed as governed at the

London Congress of 1881. The establishment of a Section of Oral and Dental Surgery, is a full admission that it constitutes a part of the domain of general medicine and surgery, and that all who, by education and proper legal authority, practice in that special department, are "members of the regular medical profession." At the London Congress they registered with the common prefix "Dr." as did a large proportion of eminent members of the profession in other departments. At the Congress in Washington it will be proper for them to register with the title Dr., M. D., D. M. D., or D. D. S., according to the terms of the authority conferring upon them the right to practice their profession.—*Journal of American Medical Asso.*

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## Editorial, Etc.

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### SOUTHERN DENTAL ASSOCIATION.

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The Nineteenth Annual Meeting of the Southern Dental Association will be held at the Hygeia Hotel, Old Point Comfort, Virginia, August 30th, 1887.

This meeting will probably be the largest and most enthusiastic gathering of dentists ever held in the United States. Everything possible will be done to make it practical, and therefore profitable.

The Chairman of the Executive Committee and Committee of Arrangements will be in attendance Saturday, August 27th, to see that all the arrangements are perfected.

As there will be a very large attendance, and many arriving at the same time, comfort and convenience will be promoted by notifying Mr. Pike, Manager of the Hygeia, of intended arrival.

The whole of Thursday, and, if necessary, the early morn-



ing of each of the other days, before the hour for regular session, will be devoted to Clinics. This feature of the meeting will receive particular attention.

We believe the arrangements will be as near perfect as it is possible to make them.

For the Operative Department we will have nine chairs, with engines, brackets, cases of instruments, gold, and all other necessary appliances, so arranged that the spectators can witness the operations with comfort, without inconvenience to the operators.

All the latest improvements in Electrical Apparatus will be exhibited and demonstrated.

The room for the Prosthetic Department will be fitted up with everything necessary for practical work.

Both rooms are large, light and airy, and in every way admirably adapted for clinical demonstrations.

The Committee of Arrangements will take pleasure in accommodating any member of the profession who may wish to give a clinic, in either Operative or Prosthetic Dentistry, and whose name is not down on the programme.

*Clinical Operators.*—Chas. L. Alexander, Charlotte, N. C., Electric Mallet; W. H. H. Atkinson, New York, Implantation and Sponge Grafting; A. E. Baldwin, Chicago, Immediate Root Filling; W. G. A. Bonwill, Philadelphia, Mallet, Crowns &c.; A. G. Bouton, Savannah, Ga., Separators and R. D. Clamps; E. Parmley Brown, Flushing, N. Y., Specialties; Wm. Crenshaw, Atlanta, Ga., Electric Mallet and Cohesive Gold; W. B. Finney, Baltimore, Md., Contour and Crown Building; J. H. Harris, Baltimore, Md., Soft Gold and Automatic Mallet; T. May Hunter, Fayetteville, N. C., Gold Filling, Hand Pressure and Mallet; Henry C. Jones, Richmond Va., subject not given; H. J. McKellops, St. Louis, Mo., Herbst's Method and Appliances; Ed. C. Kirk, Philadelphia, Implantation; C. H. McCowan, Norfolk, Va., Electric Mallet; H. A. Parr, New York, Universal Separators; Safford G. PeFry, New York, Separators and Rubber Dam; G. S. Staples, Sherman, Texas, Rubber Dam and Wire Clamps; V. E. Turner, Raleigh, N. C., Soft and Cohesive Gold Filling; S. A. White, Savannah, Ga., Plastic Fillings; G. H. Winkler, Augusta, Ga., Soft Gold

Fillings; E. T. Starr, Philadelphia, Illustrated Diagram of Dental Arch; George Evans, New York, Crown and Bridge Work; W. W. Evans, Washington, D. C., subject not given; D. Genese, Baltimore, Md., Continuous Gum Work; C. P. Grout, New York, Crown and Bridge Work; H. W. Howe, Lawrence, Kansas, Blow Pipe and its work; R. Finley Hunt, Washington, D. C., Celluloid and Gold lined Rubber plates; C. E. Kells, Jr., New Orleans, Modes and Methods with Ideal office, with complete Electric Apparatus; J. Rollo Knapp, New Orleans, Crown and Bridge Work with Cohesive Gold; John H. Meyer, New York, Continuous Gum Work, J. J. R. Patrick, Belleville, Ill., Gold Crowns and Appliances, Rubber Work; Walter R. Starr, Philadelphia, Crown and Bridge Work and Gold Lining; H. A. Parr, New York, Crown and Bridge Work.

## STANDING COMMITTEES.

*Education.*—J. H. Coyle, Ga., W. H. Morgan, Tenn; J. H. Durham, N. C.; F. J. S. Gorgas, Md.; J. Y. Crawford, Tenn; G. W. H. Whittaker, Ga.; J. Taft, O.

*Hygiene.*—W. H. Richards, Tenn.; Morgan Adams, Miss.; J. T. Griffith, N. C.; W. J. Barton, Texas; W. D. Dunlap, Ala.; N. A. Teague, Ga.; Wm. B. Pleasants, Va.

*Pathology and Therapeutics.*—W. C. Wardlaw, Ga.; R. B. Winder, Md.; J. H. Prewitt, Ky.; W. J. Reese, Texas; A. T. Bouton, Ga.; G. M. Rosseau, Ala.; R. B. Adair, Ga.

*Histology and Microscopy.*—B. H. Catching, Ga.; D. R. Stubblefield, Tenn.; Geo. H. Winkler, Ga.; T. T. Moore, S. C.; J. L. Fountain, Texas; Chas. L. Steel, Va.

*Chemistry.*—E. S. Chisholm, Ala.; L. P. Dotterer, S. C.; L. G. Noel, Tennessee; Theodore Johnston, S. C.; W. H. Marshall, Miss.; B. H. Douglas, N. C.

*Operative Dentistry.*—M. C. Marshall, Ark., Geo. S. Staples, Texas; Wm. Crenshaw, Ga.; E. E. Kells, La.; E. L. Hunter, N. C.; W. H. Morrison, Mo.; J. W. Scribner, Va.

*Mechanical Dentistry.*—J. Rollo Knapp, La.; W. R. Bull, S. C.; A. H. Hilzlim, Miss.; R. R. Freeman, Tenn; J. W. Hunter, N. C.; E. J. De Hart, La..

*Literature and Voluntary Essays.*—B. H. Teague, S. C.;

H. J. McKellops, Mo.; H. M. Grant, Va.; A. E. Baldwin, Ill.; T. H. Parramore, Va.; A. O. Rawls, Ky.; J. R. Patrick, Ill.; W. W. H. Atkinson, N. Y.; E. Parmly Brown, N. Y.; J. B. Hodgkin, D. C.; O. S. Solomon, La.; F. Y. Clark, N. Y.; G. W. Reinhert, Miss.; J. B. Patrick, S. C.; Henry W. Morgan, Tenn.

*Dental Appliances.*—J. S. F. Wright, S. C.; James Johnston, Va., E. M. Allen, Ga., Henry E. Beach, Tenn.; J. F. Thompson, Va.; C. L. Alexander, N. C.; W. S. Carruthers, Texas.

*Publication.*—R. A. Holliday, Ga., J. S. Franklin, Tenn.; W. S. Bacon, Va.; W. B. Finney, Md.; Geo. F. Keesee, Va.; L. M. Cowardin, Va.

The Southern Passenger Association has reduced the fare, to those attending with their families, to one and one third lowest limited rate for the round trip.

All who wish to avail themselves of this liberal concession, should write *at once* to Dr. J. Y. Crawford, 156½ Church St., Nashville, Tenn., for the necessary certificates and instructions, giving the names of those for whom the certificates are required.

This applies to all the roads south of the Ohio and Potomac rivers, and east of the Mississippi.

The roads North and West make the following arrangements:

"Each person attending must purchase a first-class ticket to the place of meeting, for which he will pay the regular fare, and upon request the ticket agent will issue to him a certificate of such purchase.

"If through tickets can not be purchased at the starting point, purchase to the most convenient point where such through tickets can be obtained, and re-purchase through to place of meeting, requesting a certificate from the ticket agent at the point where purchase is made.

"Tickets for the return journey will be sold by the ticket agent at the place of meeting at one-third the highest limited fare, only to those holding certificates signed by the ticket agent at the point where through ticket to the place of meet-

ing was purchased, and countersigned by the Secretary of the Association, certifying that the holder has been in attendance upon the convention.

"Tickets are good, going, three days before the meeting, and, returning, three days after adjournment."

Parties coming from Texas and Arkansas will apply to Dr. E. S. Jones, Houston, Texas, for certificates.

The social features of such a gathering will not be ignored. The Virginia State Dental Association, at whose invitation we meet in this State, stands pledged to extend a hearty old-fashioned Virginia welcome to all our guests.

The address of welcome will be delivered by Hon. Fitzhugh Lee, Governor of Virginia.

The meeting will be presided over by W. W. H. Thackston, M. D., D. D. S., the oldest living graduate of Dentistry in the world, who during forty-five years of active practice has been noted for his enthusiastic love of his profession and is still among the most earnest workers for its advancement.

The time has been fixed with special reference to the meeting of the International Medical Congress.

On Saturday, September 3d, a special Steamer will convey the Association and our guests to Washington City, going up the Potomac, one of the loveliest rivers in the world, by daylight, passing Mount Vernon, the home of the "Immortal Washington."

The place of meeting is one of the most delightful resorts on the Atlantic Coast, and if the buildings had been constructed with special reference to such meetings, the arrangements could not have been better.

The manager, Mr. Pike, has generously reduced the fare to those attending the meeting and to members of their families, to \$2.50 per day, and promises to "lay Chesapeake Bay and the whole surrounding country under contribution" for our comfort.

Nearly all the Dental Manufacturers in the country have signified their intention to make large display of their goods, and will exhibit everything new in the way of instruments and appliances.

#### OFFICERS FOR 1887.

President, W. W. H. Thackston, Virginia; First Vice-

President, B. H. Catching, Georgia; Second Vice-President, J. Rollo Knapp, Louisiana; Third Vice-President, W. H. Richards, Tennessee; Corresponding Secretary, J. Y. Crawford, Tennessee; Recording Secretary, L. P. Dotterer, South Carolina; Treasurer, H. A. Lowrance, Georgia.

*Executive Committee.*—J. Hall Moore, Richmond, Va.; Jos. R. Woodley, Norfolk, Va.; E. S. Chisholm, Tuscaloosa, Ala.

*Committee of Arrangements.*—Jos. R. Woodley, Norfolk, Va., T. H. Parramore, Virginia; G. S. F. Wright, South Carolina.

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## Obituary.

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DR. J. R. WALKER died at Bay Saint Louis, Mississippi, June 22, 1887. A tender and faithful husband, a kind and loving father, a sincere and true friend, he was devoted to his profession, which he loved next to his family. He had the courage of his convictions, and in his ardent nature maintained them with zeal, and often with enthusiasm. He was not perfect, as none of us are, but his mistakes may be attributed to this trait in his character, for he always pursued the course that he thought was right.

Let us extend our sympathy to his family, who have sustained the greatest loss, and keep green the memory of his many virtues.—*R. F. H., in Dental Cosmos.*

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RALPH C. PURNELL, M. D., D. D. S., died July 26th, 1887. Dr. Purnell, whose sad death it devolves upon us to record, was a young man of sterling qualities and in the full vigor of health. We can scarcely realize that one, whose face had become so familiar at the University of Maryland during the past three years, has been so suddenly cut off in the prime



of life. Dr. Purnell was a young man of fine social qualities and a general favorite with all who knew him, and his sad death will not only be a shock, but a matter of deep regret to his many friends in this city, where he has resided during his studentship at the University of Maryland. He was a graduate of the Dental Department of the University of Maryland of the class of 1886, and in March last, having taken the graded course, received the degree of Doctor of Medicine in the class of 1887 of the University of Maryland School of Medicine. In March last he was appointed Assistant Demonstrator in the Dental Department for the session of 1887-88. The following account of his death appeared in the daily *American*, of this city:

"Dr. Ralph Purnell, of Snow Hill, Md., was drowned yesterday, July 26th. The doctor, in company with his young cousins, Sidney Burroughs and Thomas Collins, were bathing in the surf at Scott's Beach, near here, when Dr. Purnell, who was but a poor swimmer, was carried beyond his depth by the undertow, and becoming fatigued, called loudly for help. In response to his cries, young Collins made an effort to help him, but as soon as Collins reached him the doctor clasped him tightly in his arms. Collins breaking loose, held out one foot and told the doctor to take hold of his foot and he would tow him to shore. This the doctor did, and immediately started to climb upon Collins again. Fortunately for Collins, a huge wave separated them, when Dr. Purnell immediately disappeared, and was seen no more for about an hour, when his lifeless body was found about a quarter of a mile from where he was drowned. Mr. Trump, of Wilmington, Delaware, went in the surf, and finally succeeded in finding the body, which was brought home last night."

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## Monthly Summary.

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TEMPERATURE OF THE HUMAN SKIN.—Jointly with the Messrs. Kellermann and Wiedemann, Mr. Kunkel has endeavored to ascertain the temperature of the exterior teguments. For this purpose, he availed himself of a thermo-

element of German silver and iron, in the shape of a seal, and of easy manipulation (as described more accurately in the original communication). One single determination (until the needle of the galvano-meter has reached its definite position of rest) required twelve seconds only. The apparatus, although not entirely free of occasional mistakes of observation, gives results which may be called highly satisfactory. In men from 20 to 30 years of age, temperatures were found as follows. Skin of the face about  $31^{\circ}\text{C}$ , (between  $29.5$  and  $32$ ); protruding parts of the head, such as the tip of the nose, lobes of the ear, showed temperatures as low as  $24^{\circ}\text{C}$ ., and even  $1-2^{\circ}$  less, not unfrequently; hand  $27-29^{\circ}$ . Besides this the skin in places where muscles are located, shows itself to be hotter in comparison with places over bones and tendons. The difference is  $1^{\circ}$  and more. Muscular contractions increase the temperature of the skin to the amount of  $0.6^{\circ}$ . As the contraction ceases, the small increase in temperature gradually recedes. For the trunk,  $30-32^{\circ}$  were found, also in places which are covered with clothes; for the skin on the foot  $26.5-28.0^{\circ}$ . At  $1\text{ F. } 5^{\circ}\text{C}$ . temperature of the room, the temperature was:

On the coat.....	22.3°
" waistcoat.....	24.2
" linen shirt.....	28.2
" skin .....	31.2

At  $19.5^{\circ}$  temperature outside:

On the worsted coat.....	25.3°
" linen shirt .....	27.8
" woolen shirt.....	28.9
" free surface of the skin.....	31.4

Lastly, at  $21^{\circ}$  temperature of the room, over the region of the liver:

On the waistcoat.....	23.7°
" linen shirt.....	23.7
" woolen shirt .....	27.3
" skin.....	31.5

The highest temperature was shown generally by the vigorous age. At 2 years old a child showed from  $25-28^{\circ}$  temperature of the skin (in lightly covered places from  $26-27^{\circ}$ ). Two 14-year old boys showed  $27-29^{\circ}$ .—*Reports of the Meetings of the Physikalisch-medizinische Gesellschaft zum Würzburg*, 1886.

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ARTICLE I.

TEETHING: IS IT A COMMON CAUSE OF  
DISORDER.

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BY SELWYN A. RUSSELL, M. D., ALBANY.

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It is the belief of mothers almost universally that most disorders of children are due to teething; this belief is, very unfortunately, too common among physicians. On the contrary, it is the belief almost unanimously of experienced specialists who devote themselves to the treatment of children's diseases in America and abroad, and whose books are authority with the profession everywhere, that teething is rarely the cause of children's disorders, and, as a rule, the cause of none. The object of my remarks this evening is to show the mistake that is daily made, by the profession as well as the laity, in allowing the so-called teething disorders to go on without treatment till a stage is reached in which the health, and perhaps the life, is in jeopardy. For example, every mother says of her child's diarrhoea that it is a sort of mysterious vent by which is thrown off a



mysterious something that would otherwise "go to the brain," and cause disturbance there; and she not only feels sure that the baby's health is protected by this disorder, but is equally sure that without it other more serious disorders would supervene; so she makes no effort to check it. From the sixth month to the twenty-fourth, loosely speaking, the child is cutting its teeth, so that every ailment that occurs during that period will most likely coincide with symptoms of teething. The physician is, of course, anxious to assign a cause to every disorder, and as he knows the mother's prejudice in favor of teething, and being himself averse to careful physical examination of the child, he yields to the mother's bias, says the child is teething, therefore the disorder. How often have serious affections been thus overlooked and the symptoms misinterpreted or altogether ignored!

If a disease is to be considered as a consequence of teething, it must not simply now and then coincide with the cutting of a tooth, but the coincidence should be exact as to time, and repeated, if not with every tooth, at least frequently. We cannot consider any thing the sure cause of an effect so long as another cause is equally probable. As our knowledge of the causes of diseases in children has increased, the importance of teething as a cause has decreased, and we now reject many of the alleged effects of teething that physicians formerly admitted. The chief difficulty arises from ascribing to teething disorders due to other causes, which might have been easily removed at the outset.

If any disorder exist, supposed to be caused by teething, it is inferred that the child is teething, whether it is or not. So the parents are confused, the physician himself being in many instances to blame.

Some disturbances of the digestive system, some nervous disorders, eruptions on the skin, etc., it is known, are occasionally due to teething.

The difference of opinion as to the importance of teeth-

ing as a cause of disease is not a simple dispute of terms, but one which has a real interest in the nursery. If the parents believe that teething causes all the ailments attributed to it, they are, as is daily seen, likely to regard the ailments as nearly, if not quite as much, a matter of course as the natural teething process, and they consider it useless to try to cure them until teething is complete. As a result of these errors and confusions, it too frequently happens that disorders very tractable at the outset are allowed to progress unopposed until they reach a serious stage. On the contrary, if we assume that teething is rarely the real cause of disease, the parents will seek some other cause for any disturbance that may be present, and endeavor to remove it. (Yale.)

With these few prefatory remarks I beg to read to you quotations from the best authorities on this question, which are taken sometimes from the chapters on dentition, sometimes from chapters on diarrhœa, enteritis, eclampsia, etc. The quotations first given are from authorities who regard teething as a common cause of disorder; following these will be found authorities, as a rule better known, and in the large majority, who look upon teething as a physiological process rarely if ever giving rise to disorders.

Meigs and Pepper, seventh edition, page 412, says: "Dentition may be mentioned as exerting a strong influence in the causation of enterocolitis. That the evolution of the teeth, though a physiological process, is a powerful predisposing cause of diarrhœa and enteritis, cannot be doubted at the present time."

Speaking of cholera infantum, they say: "We believe dentition to be a most powerful predisposing cause of this disease, and yet it is less influential than age, for vital statistics show that it is about twice as fatal in the first year as in the second, though the process of dentition is certainly more active and continuous in the second than in the first year. We have rarely observed it before the beginning of the process of dentition, and it is certainly very rare after its completion."

They also say that it is a frequent cause of laryngismus stridulus. The age at which it occurs most frequently the age from six to eighteen months, the very period during which the process of dentition is most active, would alone go far to show that this must constitute one of the most powerful predisposing, if not exciting, causes.

Day, in "Diseases of Children" (1881), page 69, says: "What share teething exerts in causing diarrhoea it is impossible to say; but there is a close connection existing between these states. When diarrhoea is present we do not hastily attempt to check it if the teeth are piercing the gums, and the mouth is uneasy; still, if the drain continues or is excessive, the child becomes exhausted, and the possibility of convulsions must not be overlooked."

Ellis ("Diseases of Childhood"), London, says on page 10: "During dentition the child's health requires unusual care; the bowels must be regulated, the diet strictly attended to, the gums lanced when they are hot and swollen; the diarrhoea of teething is natural, and if in moderation should not be interfered with."

Vogel ("Diseases of Children," page 109) says: "A mild diarrhoea, five or six passages in twenty-four hours, is very beneficial to teething children, for cerebral affections are thereby most surely prevented. It occurs, in fact, as often as catarrhal stomatitis, and both processes might very appropriately be regarded as physiological conditions, if their aggravations, which often attract attention, did not attain to distinct diseases, and really display serious characters." He thinks the excessive quantity of saliva at this time, swallowed by the child, is the cause of diarrhoea.

Dr. Hillier, London, in his book on "Diseases of Children," says: "Until recently nearly all convulsions of infants were ascribed either to teething or to worms; it is very doubtful whether in a healthy child these causes can produce convulsions at all; in a predisposed subject they no doubt often excite them." (page 380.)

West, in his "Lectures on the Diseases of Infancy and

Childhood," page 507, says: "You will observe that the period of greatest prevalence of diarrhœa coincides exactly with that time during which the process of dentition is going on most actively, and that exactly half of all cases of diarrhœa occurred in children between the ages of six months and two years. So close, indeed, is the connection between teething and diarrhœa that a French physician, M. Bouchat, found that only twenty-six out of 138 children entirely escaped its attack during the period of their first dentition, while forty-six suffered from it severely. The older writers on medicine, whose notice this fact did not escape, attributed the disturbance of the bowels to a sort of sympathy between the internal canal and the gums, swollen and irritated by the approach of the teeth to their surface. The frequent observation of cases in which an attack attends the irruption of each fresh tooth, and ceases when it has cut through the gum, shows that such an hypothesis is not altogether without foundation. But, besides the influence of nervous irritation in quickening for a time the peristaltic action of the bowels, and thus inducing diarrhœa, it must be borne in mind that there exists during the period of teething a *more abiding cause*, which strongly predisposes to its occurrence. All parts of the digestive canal, and of its dependencies, are now undergoing an active evolution to fit them for the proper assimilation of the varied food on which the child will soon have to subsist. Just as the salivary glands now begin to secrete and pour out saliva in abundance, so the whole glandular system of the intestines assumes a rapidity of growth, and an activity of function, which, under the influence of comparatively slight causes, may pass the just limits of health. In too many instances, causes, fully adequate to excite diarrhœa, are abundantly supplied in the excessive quantity or unsuitable quality of the food which the infant is furnished; for it is forgotten that its condition is one of transition, in which more than ordinary care is needed, while in accordance with that mistaken humoral pathology so popu

lar among the vulgar, the profuse secretion from the irritated glands is regarded as the result of a kind of safety valve arrangement whereby nature seeks to moderate the constitutional excitement attendant upon teething." \* \*

\* Page 451: "Not only do nurses attribute to teething the most varied forms of constitutional disturbance, and mothers express serious apprehension as the period of dentition approaches, but medical men hold forth to anxious parents the expectation that their child will have better health when it has cut all its teeth. The time of teething, too, is in reality one of more than ordinary peril to the child, though why it should be is not always rightly understood. It is a time of most active development of the organism—a time of transition from one mode of being to another, in relation to all those important functions by whose due performance the body is nourished and built up. Statistics prove the dangers of this period, and warrant us in regarding the completion of the process of teething as a fair subject for congratulation.

"The error which has been committed with reference to this matter, not merely by the vulgar, but by members of our own profession also, consists, not in over-rating the hazards of the time when changes so important are being accomplished, but in regarding *only one of the manifestations* (though that, indeed, is the most striking one) of the many important ends which nature is then laboring to bring about. \* \* \* The epoch of dentition is to be looked at just in the same way as that in which we regard the epoch of puberty. Constitutional disturbance is more common, and serious disease more frequent, at those times than at others; but their causes lie deeper than the tooth that irritates the gum that it has not pierced in the one case, or than the uterus which has not yielded the due discharge of blood in the other. You might produce hemorrhage from the uterine vessels in the latter instance, or cut through the gum in the former, with no other effect than that of aggravating the condition of the patient. \* \* \*



"I warn you against looking upon all ailments as symptomatic of the local uneasiness which the child suffers in its mouth. Some persons, indeed, act as if they held this notion to its fullest extent; and following up in practice this coarse, mechanical theory, they lance the gums of every child who has not yet cut all its teeth, almost or altogether irrespective of the nature of the affection from which it suffers. Such a course is nothing better than a piece of empiricism which causes the infant much pain, and is useless or mischievous in a dozen instances for one in which it affords relief. Still less is the gum lancet to be used merely with the view of expediting the process that nature is engaged in. The gradual protrusion of the teeth occasions the slow absorption of the superjacent gum, and for this process the division of the gum by a scalpel is at best but a clumsy substitute."

Eustace Smith, M. D., London, on "Wasting Diseases of Infants and Children," says: "Many children are said always to cut their teeth with diarrhœa. Perhaps, however, dentition in these cases is not so entirely to blame as is commonly supposed. No doubt, during the cutting of the teeth the bowels generally are in a state of irritability, for we know at these periods the follicular apparatus of the intestines is undergoing considerable development. The bowels then are ripe for diarrhœa, there is increased sensitiveness to the ordinary exciting causes of purging, but without the exciting causes diarrhœa is by no means a necessary result of such a condition of the alimentary canal. We find that looseness of the bowels is more common in summer than in winter; that is, when the changes of temperature are rapid and unexpected.

It is no doubt the case that functional derangements are frequent during teething, but it is often unfair to attribute these directly to the irritation of an advancing tooth. Looseness of the bowels has been looked upon by some as a natural method of relief to the system, and fears have been held out of grave troubles which might ensue if the

looseness were too suddenly arrested. Such fears are groundless. *A catarrhal condition of the bowels should be cured as quickly as possible, especially during dentition..*" (Also see Smith in Quain's Dictionary of Medicine.)

Dr. John Cheyne (1802), "Essay on Diseases of Children," says that diarrhœa is often seen in cases where there is no swelling of the gums, no salivation, nor any appearance of pain or tenderness about the mouth, in cases where the child is cutting its teeth easily, and even in children three months old, who have no teeth at all.

Henoch, Berlin (1882), "Lectures on Diseases of Children," page 62, says: "Every physician knows that the most varied disorders of infants are attributed to teething, and are therefore neglected or even regarded as salutary. In the opinion of the majority of physicians, however, teething is a physiological process which cannot give rise to any morbid phenomena. But it is questionable whether this decided negation is always justifiable, and, although fully recognizing the services thus rendered in restricting "teething" diseases, I cannot suppress certain doubts regarding the universality of this view. We know that the perforation of the teeth is due to the fact that the growing root of the tooth gradually presses the crown forward and pushes through the alveolus after perforation of the overlying gum, which grows continually thinner from the increasing pressure, Vomiting, diarrhœa, even spasmodic cough, may disappear, and have done so, when one or more teeth have passed through." As to cutting with the lancet, he says: "It is now very generally held that every attempt to facilitate the eruption of the teeth, and thus remove the symptoms due to difficult dentition—so called—is absolutely useless. I have, in earlier years, performed scarification with sufficient frequency to convince myself of its entire inutility, and it even appears to me that the cicatrix formed may increase the difficulties connected with the penetration of the tooth."

Strumpell says: "Nervous disturbances are often

referred to dentition. The most frequent symptom of this kind is eclampsia. The attacks are sometimes called 'teething convulsions. Although the laity go too far in ascribing all sorts of nervous disorders to teething, still experienced specialists do recognize the *possibility* of such an origin for many cases."

In Buck's "Handbook of the Medical Science," Dr. William H. Flint, New York, writes as follows: "The modern belief that dentition is not the cause of disorders in children has subserved an extremely useful purpose by calling attention to the fact that comparatively few constitutional disturbances are really dependent upon teething, and in doing away with the erroneous belief that the checking of these disorders would exert a harmful effect upon the natural course of dentition."

J. Lewis Smith, New York, in his book on "Diseases of Infancy and Childhood," says: "The opinion formerly entertained by the profession, and now prevalent in the community, that many infantile maladies arise directly or indirectly from dentition, is erroneous. Still, there are physicians of experience who believe that teething is a common cause of certain maladies, especially of functional derangements, even of organs remote from the mouth. On the other hand, equally good observers, and the number is increasing, almost wholly ignore the pathological results of dentition. They say that, as it is a strictly physiological process, it should, like other processes of the kind, be excluded from the domain of pathology. \* \* \* Every physician is called now and then to cases of serious disease, inflammatory and other, which have been allowed to run on without treatment, in the belief that the symptoms were the result of dentition. I have known acute meningitis, pneumonitis, and entero-colitis, even with medical attendance, to be overlooked, and the symptoms attributed to teething during the very time when appropriate treatment was most urgently demanded. Many lives are annually lost from entero-colitis, the parents and friends believing



the diarrhœa to be symptomatic of dentition, a relief to and therefore not to be treated. Such mistakes are traceable to the erroneous doctrine once inculcated in the schools, and still held by many of the laity, that dentition is directly or indirectly a common cause of infantile diseases and derangements. \* \* \* It is certain that in most cases of diarrhœa which are attributed to dentition there are other causes, such as unsuitable food, or bad housing or residence in an unsalubrious locality. It is certain, regards city infants, that the chief causes of diarrhœa during the period of dentition are strictly anti-hygienic, dentition being quite subordinate as a cause, and probably ordinarily not operating at all as such. But when, as sometimes happens, at each period of dental evolution, the infant is affected with diarrhœa, the influence of teething is apparent. Such cases enable us to see that teething may really sustain a causative relation to certain diseases not located in the buccal cavity."

Referring to the lancet, he writes that it is much less frequently employed than formerly. It is used more by the ignorant practitioner, who is deficient in the ability to diagnosticate obscure diseases, than by one of intelligence who can discern more clearly the true pathological state. "It is well to bear in mind the remark of Trousseau, that the tooth is not released by lancing the gum over the advancing crown. The gum is not rendered tense by the pressure of the tooth, as some seem to think, for the incision remains linear, and unites by first intention in a day or two. Thus the effect can often last but a day or more. It may help us to understand how active, how powerful, the process of absorption is, if we reflect that the roots of the first teeth are more or less absorbed by the advancing second set, without much pain or suffering from the pressure. If the calcareous particles of the teeth are so readily absorbed, what is the foundation for the belief that the soft tissue of the gum is absorbed with difficulty? Too much importance has evidently been attached to the supposed tension and resistance of the gum in the process of dentition."

Dr. James F. Goodhart, London, "Diseases of Children" (1885): "Dentition is usually held to be the cause of many ailments, but to what extent it is really so is doubtful. The time of dentition is one of transition. A uniform and bland diet is changing for one of greater variety, and febrile attacks, diarrhœa, vomiting, which are so rife at this time, are more satisfactorily explained by indigestibility of food than by some occult influence of tooth-cutting."

Dr. Carl Gerhardt, Jena (1871), in his "Children's Diseases," says: "As in domestic life and among physicians there is at present very often an inexcusable slighting of children's diseases, because of the possibility of their being caused by teething, these are therefore neglected or misinterpreted; hence it is important to know that teething very rarely causes disorder, and the physician should consider the dentition at fault *only after careful examination of the food and nutrition of the child, and after an exact physical examination.* The acceptance of this theory of tooth-irritation does not alter or render unnecessary the usual treatment of the remote disorder. Very often there lies behind the teething faults of nutrition which, misunderstood or ignored, are followed by most serious consequences."

In Gerhardt's book, Vol. I., page 415, Dr. A. Jacobi, of New York, says of summer diarrhœa: "It arises from overfeeding, heat or bad air, never from teething." Dr. Jacobi has also said that "the alleged relation between teething and disease is, to say the least, a very doubtful one. \* \* \* Nothing is more harmful than overfeeding. A child of one to two months should be nursed every two or three hours; of six months and more, say five times in twenty-four hours, and not more. If a child becomes thirsty between nursing-times, give it water or barley-water."

I shall be surprised if it be not the belief of most present that teething is the most frequent cause of children's disorders; but it ill becomes us to be inconsiderate of the

opinions of a large majority of those who give their whole time to the investigation and treatment of children's diseases, and these opinions are decidedly against such belief. No one claims that teething may not *exceptionally* cause disturbance, but the exception must not be made the rule. I am satisfied that too great laxity may be charged against the profession generally for ignoring other and more potent causes of disorder and ascribing every thing to teething. When the teeth are making their appearance, other changes are going on which require attention. Toward the close of the first year, not before, the pancreas like the salivary glands, becomes active, so that, before this time, should starchy foods be given, they would doubtless cause indigestion, diarrhoea, or both. What an error it would be now to attribute to teething, as would most likely be done, this disorder of the digestive system. It is often observed that a correction simply of the errors of diet removes the disorder previously charged to teething. Mothers nurse their children too often, as a rule, and too much at a time, and rarely give them water, so that the baby's stomach obtains no rest day nor night. An adult stomach could not tolerate such abuse; it is not remarkable that the child suffers. So I feel sure that the safe ground is that teething may *exceptionally* cause disturbance as a rule none.

#### DISCUSSION.

The paper elicited considerable spirited discussion.

Dr. Vander Veer thought that teething often causes trouble, and said: When Dr. Russell has carried a child day and night, or been disturbed by another's doing the same, he will be willing enough to believe that teething causes mischief.

Dr. Culver believed, reasoning from analogy, that teething might exceptionally give rise to disturbances, but as a general rule, to none.

Dr. Ward remarked: No one claims that teething

then causes serious disease, as meningitis, as referred to the paper, but that it is the frequent cause of disorders I have no doubt. Saying that it is a physiological process and therefore incapable of causing pain is as absurd as it could be to say that digestion is never painful because physiological. I think good is often done by lancing the gums. A slight diarrhoea will do no harm to a teething child.

Dr. Thompson spoke vigorously against the idea that teething is a fruitful cause of children's diseases, as generally believed. He thought lancing of the gums useless, if not actually harmful.

Dr. Townsend believed that teething, like phimosis, might and often did give rise to reflex disturbances. The diarrhoea accompanying teething, no doubt in his mind, is frequently due to reflex irritability of the sympathetic co-motor system, where, dilatation of intestinal blood-vessels taking place, transudation of serum naturally followed. The same may be said with reference to such dilatation of blood vessels in the brain; here transudation of serum frequently fills the ventricles, with its concomitant results.

Dr. M. J. Lewi could easily believe that teething gave rise to disorders, from the fact that adults suffer so much sometimes when cutting the wisdom teeth.

Dr. Bartlett was of the opinion that only exceptionally is teething a cause of disorder. As he understood the paper, it was not a denial that teething might rarely cause disorder, but a plea for discrimination among causes, and a protest against the too common habit of physicians of siding at once with mothers and nurses in favor of such a cause, rather than to examine further for adequate cause.

Dr. Russell, in reply to the criticisms, said: As babies often cry most and are carried most before they begin to teethe at all, that argument is not convincing.

It is amusing to see Dr. Ward set up a straw man in order to knock him down. No mention was made in the

paper of meningitis as due to teething. He says the teething is fairly comparable with digestion in the matter of pain. Digestion does not cause pain; indigestion causes pain.

It may be said, in reply to Dr. Townsend, that in phimosis there is really what acts as a foreign body causing irritation—a substance that may cause irritation in the ad as well.

As to the pain attending the cutting of the wisdom teeth, it is caused chiefly by biting hard substances against the gum, and this same pain may be experienced when the gum grows over an old root.—*Medical Annals*.

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## ARTICLE II.

### MANAGEMENT OF CHILDREN'S TEETH.

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BY J. E. CRAVENS, D. D. S., INDIANAPOLIS, IND.

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[Read before the Indiana State Society.]

This is one of the gravest problems that the dental practitioner is called upon to solve; and there is, perhaps, less chronicled information upon this than upon any other special division of dental practice.

It is not to be expected that this whole subject should be embraced in a single paper, so that certain points about which the least has been written, will be presented for your consideration.

As a rule, children under three years of age are not brought to the dentist, therefore his ministrations begin usually, with completely erupted sets of deciduous teeth. The family physician is presumed to exercise supreme supervision of the difficulties of primary dentition, in subjects under the age of three years; only occasionally condescending to call the dentist into consultation as a source of much needed information. Whether or not

desired information is obtained, depends upon the dentist's opportunities for observation and his habit of improving or neglecting opportunities. In any event, the practitioner falls far short of what is rightfully expected of him by his profession, and of what is due to the little patients—whether expected or not, when he (the dentist) fails to comprehend the importance of retaining the deciduous teeth, and of teaching parents to properly appreciate them.

This instruction of parents is a labor of love and the limited number of dentists who engage in it, often find it unprofitable, thankless and discouraging. There are several reasons why the deciduous teeth should be retained until their successors are ready to erupt, and why they should receive thoughtful and skillful attention at the hands of the dentist.

The deciduous teeth are always regular in arrangement, showing them to be in nowise accidental. True they are frequently tardy, but so are other organs. They never fail to come.

Let us consider the wisdom of the order of deciduous dentition from a chronological view. These teeth erupt in groups, and the presence of the several groups furnishes an index, more or less accurate, by which may be determined the approximate age of the individual, the stage of development of certain hidden organs, particularly the stomach and indicates fairly the character of food demanded for the further development of the individual. The index thus provided is lucid enough to be consulted with profit by any intelligent, observing dentist, or even by physicians. But the physician derives no benefit from this deciduous dental index, because "he ain't built that way," and that is why he occasionally calls the dentist in consultation.

In adult subjects the masseters are the strongest pair of muscles in the body, being capable of maintaining the suspended weight of the body, and often more; but in childhood the masseters do not possess this proportionate strength, so that often the mastication of solid or fibrous

food would be for the young subject extremely difficult if not impossible, were it not for the fact that these teeth bear peculiarly sharp cusps for the quick and easy mastication of substances that otherwise would necessarily be bolted whole and uninsalivated into the stomach.

This facility of deciduous teeth for chopping the food meets the demand of stomachs of very limited digestive capability. In this respect the deciduous teeth that have been freshly erupted, present some analogy to the third stage of mechanical abrasion common to the advanced age of the human subject that has been characterized as second childhood, and in which the sharp edges of the abraded teeth enable the aged individual to comminute his food.

Every parent has probably noted the sharp spines that surmounted the cutting edges of the baby's new incisors. These spines possess wonderful penetrating power, but as the individual grows stronger, power comes to the masseter and the spines are soon worn away, leaving a plain incisive edge that is better adapted to the habits of the developing individual.

The adult teeth are from one-third to one half larger than the deciduous ones, and fifty per cent. more numerous requiring about double the capacity of alveolar arch, which the child's jaw must grow to accommodate.

This additional development of the alveolar arch is usually accomplished in six years, beginning at about the sixth year. Yet how often do we find the inferior adult centrals, at six years, coming through the gum behind the deciduous incisors and obstructing the movements of the tongue. And a little later, six months perhaps, the inferior laterals struggle through, so far back and so hedged and handicapped for space and position as to *appear* to be hopelessly shut out of the arch forever.

Right here is where mistakes are often made by dentists, by prematurely extracting deciduous incisors. So long as deciduous teeth remain and in healthy condition the arch may be expected to expand, at least until the

requisite space for the accommodation of the adult teeth has been attained. The deciduous crowns and roots seem to serve as levers and wedges by which the jaw is induced to expand at the desired points. The tongue possibly is an active factor in rendering the leverage effective.

Another reason for retaining the deciduous teeth as long as space is needed, is that the resorption of their roots is attended by a mild form of local inflammation and increased vascularity, resulting in hypernutrition of the jaw, and consequent enlargement of the alveolar arch for the accommodation of adult teeth. When it is possible to do so, all cavities in deciduous teeth should be filled, otherwise they may become so extensively decayed as to necessitate extraction.

Pulpless deciduous teeth should be retained, if possible, under conditions that may not prevent resorption of their roots, to the end that they may perform their secondary function of assisting in inducing enlargement of the alveolar arch.

The deciduous molars should be retained for good mechanical reasons. They prevent a forward tipping of the sixth year molars, particularly of the lower ones, thus preserving proper space for their immediate successors, the bicuspid. Also, they are necessary to preserve articular surfaces for the effective mastication of food. Good masticating ability is quite as essential for the child as for the adult.—*Western Dental Journal*.

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#### ARTICLE III.

### EDUCATED ABILITY AND INDUSTRY ESSENTIAL TO SUCCESS IN THE PRACTICE OF DENTISTRY AS A SPECIALTY.

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BY J. H. GRANT.

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It has been well said that no physician is qualified to practice a specialty in medicine or surgery who is not well



informed upon the fundamental branches as well as general practice of Medicine. The same opinion will think, apply to the dentist, who is, in reality, but practicing a special branch of the great healing art. No man can have too much knowledge of his profession. The world owes its progress to the man of thought, and the man of action. When both are united in the same person, the result is more than doubled, and the value of the service largely increased. I cannot appeal too strongly for general intelligence, which is the soil out of which the best specialists grow. It may be said that some of the great men of the world have had but little opportunity for training at the schools, and yet they have attained distinction as public benefactors; but they are generally recognized as exceptions to the rule, and they for that reason alone are brought before the public more prominently.

Go back fifty years ago; yes, go back twenty-five years ago, and compare dentistry then with the science of to-day, and what remarkable progress do we find. And I venture to say there is no profession in which there has been greater advancement in the same length of time than you find in the science of dentistry. And this progress is seen not only in what has been attained in the principles and practice of the profession, but also in the character and standing of its members. Many of you can remember a time when the populace thought to be a dentist required no higher talent or skill than that of a barber or blacksmith.

But what changes do we find to-day. We find it raised to that degree of proficiency that it has become a respectable profession, which to be successfully followed demands long study and thorough training, with an amount of scientific knowledge and practical skill equal to that of any other profession.

But we must confess that there are to-day, in the dental profession, as there are in other professions, those who are sadly deficient in the qualities and qualifications that

necessary to give stability to the character and standing of members of our profession. How are we to remedy this? The only way that I can see for it to be done, is to compel every one whose application comes before our examining board to either present a certificate of identify with the profession, or a diploma from some reputable school as a graduate, or pass a rigid examination before a board of educated practical dentists, in anatomy, physiology, pathology and surgery, indicating an examination entitling those who can creditably sustain themselves therein to true professional rank. I would not be arrogant or exclusive. It is desirable and inevitable, and there will always be a wide difference in the standing and attainments of dentists. I would recognize the humblest degree of skill that can recommend itself to be practical and useful. Hence I would give the hand of welcome to those young men who enter our profession that are ambitious, and by study and perseverance have qualified themselves to pass a searching and satisfactory examination without the aid of schools, and who are entitled to take rank in our profession equally with those who have been more favored by circumstances, and have availed themselves of the important, and to many the necessary aid which the schools afford. If we use discretion in our Association in admitting candidates, and the members are equally particular as preceptors in qualifying students, we will have no fears that it will be the best and only means of inducing those who enter the practice always to take a pride in elevating the profession.

To be thoroughly educated, practical and scientific means success; without this you cannot hope to succeed. There is a greater demand than ever before, upon the profession, for a higher order of acquaintance with different pathological conditions, and particularly in correct diagnosis. Hence the responsibility rests on us to strive to bring into the profession men of ability, and improve, if possible, those who are already among us, to a degree of proficiency in literature and science that will enable their fingers to work out the thoughts of their brains.

But in order to achieve success in any specialty, a general education, coupled with a knowledge of the science of that specialty, is absolutely essential to the successful practice of that specialty; hence we usually find that those who are specialists, are generally those men who have in time been general practitioners. So in the practice of dentistry as a specialty. The young man who has just returned from college after having graduated is apt to relax his studies and to imagine that he has reached the goal of his dental ambition, and only sits supinely down to await the great reputation that he anticipated during his college course.

Most of those who receive the degree of D. D. S. are at best only prepared to effectively begin the study of their chosen profession. In fact it is only then that they realize the importance of closer application to their studies in order to overcome the sensibility of their ignorance. Having first attained that proficiency, they are better able to concentrate their best energies in the exploration of the vast field of dentistry.

And now, how are we to attain the success in the practice of dentistry, after thoroughly qualifying ourselves for the practice of that specialty? Are we only to get a good location in some thriving town, among good, thrifty-going people, look out a good office location, fix it up in handsome style, put out a large sign with your name on it, appear in the first issue of your daily newspaper with a card announcing that Dr. So-and-so has arrived with all the latest improvements, (without the ability) known to the profession, and call particular attention to the cheapness of work—low prices—all done in the best manner, and can only be done by him; and sit down in your office and wait for them to come. Well, sometimes it looks as if that were about all for some classes of men to do, for they succeed oftentimes while honest, practical, scientific men do not.

There are some who, it seems are foreordained to fail, while there are others who seem foreordained to succeed.

Whatever one man attempts turns to a failure; whatever another man touches proves to be a success. One man fishes in a stream all day without catching any fish; another man goes to the same stream and at the same place and catches more than he can carry home. Our good friend whom we all respect goes to congress, and gives promise of becoming a great orator and statesman, but in a short time we hear no more of him. The Rev. Mr. S—— closes his course of study and is ordained, but there is no place for him in the vine-yard. Dr. T—— opens an office; tries to make a living by a legitimate practice, but fails, and soon closes up and seeks out a new field for labor, or goes into some other business. And so it goes.

It is a sad thing to fail; but there is no recipe which will positively guarantee a continued success in any business, except qualification, ambition, and a never-ceasing energy, coupled with a condition of our compliance to good and faithful work.

A radical mistake in the choice of a profession generally proves fatal. A man ought to find out what he is capacitated for before he starts. If he enters upon a vocation that is above his capacity he is sure to fail. No amount of industry can supply the natural defect. Some people will tell you that if you will only stick to it, no matter what line of life you have chosen, you are certain to succeed in the end. Many a poor, disappointed dentist will tell you this is not true; he has done his best and failed.

In every profession there is a large percentage of failures, simply because there are so many who strike higher than they can reach. It requires no great amount of foresight to predict that certain persons whom we know can never be artists, or poets, or public speakers, and it requires but a moment's notice, oftentimes, to the qualified experienced and ambitious dentist, to tell who are his successful competitors in his profession. If one has the qualifications and genius for any particular profession, it will

manifest itself soon enough. If the fire is in him it will soon blaze out of itself. Ambition is the spur that makes men struggle with destiny. It is life's own incentive to make purpose great and achievement greater.

Each of us has his special label for a particular position, and by it we steadily and regularly, even though sometimes struggling against it ourselves, or through struggle against by others, fall into our appropriate places. Neither can we attribute this all to a fatal necessity. We are not blind-folded, shackled, manacled and led captive by an inexorable fate, or irresistible power, except as our condition is necessarily determined by previous causes, which are themselves mostly in our power, or in the power of those who have the controlling influence of our early years fraught with the conditions of a future necessity.

The world generally pushes a man the way he makes up his mind to go. If going upward is his motto, it pushes him up. If going downward, it pushes him down, and then very rapidly, gravitation always supporting the decline.

But men, if they are qualified, and have that merit that is necessary to sustain their chosen profession, will at last through perseverance, reach the goal of their ambition which they are entitled; and those who are not qualified and have not the merit will be ejected with contempt and derision.

But it is no small evil, that the avenues to fame should be blocked up by a swarm of noisy, pushing, elbowing pretenders, who, though they will not ultimately be able to enter themselves, hinder others who have by their perseverance and industry a right to enter.

Some men of talent, however, turn away in disgust from pursuits in which success appears to bear no proportion to defeat. Yet there are some who have sufficient confidence in their own talents, and sufficient elevation of mind to wait with patience while dunce after dunce passes before them.

But let me admonish the younger members of this faculty

that success is impossible without labor also. A fortune is not made in a day, without toil, neither is a reputation made without qualifications and industry. Newton said that "all he had ever accomplished was the result of industry," but it was his genius that made him industrious. So with us in our profession: ability and willingness to labor are the two great conditions of success. "And the degree of estimation in which any profession is held, becomes the standard of the estimation in which the professors hold themselves."—[Burke.]

DISCUSSION.

Dr. Staples: *Mr. President and Gentlemen*—I don't feel like we ought to allow that paper to pass without discussion. Some points in it are worthy the consideration of any man; some things which I have said a good deal about. There is no use talking about making a dentist of a man that nature has not predestined to be such. If we as dentists would properly consider this matter in taking students into our offices there would be fewer failures in the profession than there are, and until we do this thing failures will multiply every day. That we can't make a dentist out of every young man I become more thoroughly convinced every day. Yet men enter the dental profession and make failures and never seem to comprehend why it is they fail, while to me it is perfectly plain. I believe I can plug a tooth, but take no credit to myself for it; I was born that way. The idea seems to prevail among practitioners that any young man of average sense can be made a first-class dentist. It can't be did. I am satisfied that is the cause of half the failures Dr. Grant speaks of in his paper. In the selection of students we should be exceedingly particular. In a practice of twenty years, and applications to the number of fifty during that time, yet I have my first student to take. The reason I have never accepted one was because I did not think they were the proper material

to make dentists; and of all I have refused I don't think one is a dentist to-day.

Dr. Williams: I agree with Dr. Staples to a certain extent. A man must possess the necessary natural endowments, yet while quite small at first, by perseverance and cultivation may be developed and finally make a first-class dentist and a success. We are not all perfect by any means and we are not all born thorough dentists.

Dr. Turner: *Mr. President*—I wish to endorse what Dr. Staples has said. I was much impressed with what I saw in a paper saying that "Dentists are born, not made." I can say "Amen" to that. Unless a man has music in his soul you can never make him a musician. He may get so he can hammer a tune, but not much music. Just so in the mechanical department of the dental art. I believe it is talent that is born in a man, just like music, drawing, oratory, or anything else, and if we would be more careful in selecting material as students it would tend to elevate the profession to a greater degree of success.

Dr. Barton: I endorse those things which were said. A prominent lady was asked why she cut her hair short and she said it was because she was born with short hair and I think we were born with a capacity for dentistry that must be cultivated. A few persons have no qualifications for this kind of pursuits, but the best portion of those qualifications for dentistry is acquired. Some of it is born with them.

Dr. J. H. Grant; *Mr. Chairman*—I have had no experience with students, because I have always been a student myself. But while at college I had the opportunity of seeing a great deal of raw material develop into finer material. Students who came there perfectly green, not knowing anything about the mechanism used in the profession, and while they were looked upon as students who would never accomplish any great results, yet by proper instruction would turn out to be very bright lights—superior to many who had had better advantages.

Dr. Staples: *Mr. President*—I am satisfied if the history of those men who attained success could have been learned it would have been found that they were natural mechanics. I have heard a great deal about failures in materials. One man advocates amalgam, another tin foil, another soft gold foil, and this, that and the other; and the only difficulty is that there is not a natural mechanic at the end of the instrument to apply the material to the tooth. There is no doubt but some failures are the result of a want of thoroughness in the operation, but a majority of them are for want of natural skill when they fail in dentistry, and if you sift the thing to the bottom you will find that the good dentists were natural mechanics from the start.

Dr. Goolsbie; *Mr. President*—I think we would be justified in going a little back to the position the gentlemen have taken. I have been watching a little history myself—hereditary predisposition. I think there is a great deal in it, and it is our duty as dentists, if we wish to promote the best interests, and elevate the standard of the profession, to be very careful in selecting our students.

Dr. Storey; There are some facts presentable for our consideration in the varied business and professional pursuits of life which we cannot ignore. We see a man start out in life with a fine education, seemingly qualified for any pursuit. He attempts to merchandise and makes a failure. Another man starts out with equally fair prospects; he has been educated for a doctor. He leaves college bright in theory; full of hope, and returns home and opens a nice office; puts himself behind a two-horse—and makes a failure as a physician. The reason for this is, because the Almighty never intended him to be a physician. It is the duty of parents to find the bent of the child's disposition, and to cultivate it. A child always starts in the right direction, and if you, as a parent, will encourage and cultivate his inclinations, he will be sure to "get there."—*Texas Dental Journal*.



## ARTICLE IV.

## ANÆSTHETICS AND ANÆSTHESIA.

BY J. L. FOUNTAIN.

As chloroform, ether, and nitrous oxide gas are the anæsthetic agents most generally in use, my remarks will be confined principally to them. Neither of these agents should be used for anæsthetic purposes until strict conformity to the standard of the U. S. Pharmacœpia has been ascertained.

The term anæsthetic, proposed by Dr. Oliver Wendell Holmes, means an agent capable of producing anæsthesia or insensibility to pain. It is true anæsthesia is a term which, according to its etymological signification, should be applied to the loss of touch, chiefly, and analgesia should be used to signify the loss of the sense of pain; but the word anæsthesia, as expressive of the state of profound unconsciousness induced by anæsthetics, is now so firmly riveted in the mind by usage that it is better to retain the present nomenclature.

Insensibility to pain may be produced without coincident loss of the common sensation of touch. By the inhalation of ether, chloroform bichloride of methylene nitrous oxide gas, and some other substances, the function of animal life may be so far suspended that surgical operations involving intense pain can be performed entirely without the consciousness of the subject concerned.

When the vapor of an anæsthetic is inhaled a sense of faucial irritation and suffocation is experienced and a cough of more or less intensity may be produced. The irritation of the fauces excites an increased flow of mucous and the reflex act of swallowing. The feeling of the need of air causes the patient to push aside the inhaler or sponge, and in children may lead to violent struggling. The sensibility

of the glottis is soon diminished, the cough ceases, and the inhalation then proceeds quietly. The first effect of an anæsthetic is a general exhilaration; the pulse increases in frequency, the respirations become more rapid, and sometimes assume a sighing or convulsive character; the face flushes; talking, laughing, crying, singing, and sometimes praying indicate the cerebral intoxication. The stage of excitement has a varying duration in different individuals, and is more pronounced in character and duration in those who are suffering from chronic mercurial poisoning, and in hysterical. At this period, though the patient can be easily aroused, the sensibility to pain is decidedly decreased, but the sensibility to touch may yet be unimpaired. Taste and smell are abolished, and the sight is either abnormally acute, or is perverted by illusions. If the inhalation is continued, the patient passes into a state of complete unconsciousness. In women and children, and males reduced by illness, the production of insensibility, if the inhalation be not pushed too rapidly, takes place quietly, but if the subject be a robust male in full health, especially if the inhalation has been proceeded with rapidly, the stage of relaxation and insensibility is preceded by a convulsive tetanic stage, in which the voluntary muscular system and respiratory muscles become rigid, the breathing assumes a stentorous character, and the face becomes cyanosed. This condition of rigidity is similar to, if not identical with, the tetanic stage of the epileptic paroxysm. If the administration of the anæsthetic is continued still further, the tetanic rigidity subsides, the cyanosis disappears, the breathing proceeds quietly, and a condition of complete muscular relaxation and of abolition of reflex movements is established. When this stage is reached the arm drops without resistance when allowed to fall, the conjunctivæ are insensible to irritation, the pupils do not alter in size when exposed to the light, and no mechanical irritation produces the least manifestation of pain. The surface of the body is cool, and bathed in abundant perspiration, the countenance is placid, the eyes

closed, the pupils rather contracted than dilated, the breathing is easy but more shallow than normal, the pulse slower—it may be feebler or stronger than normal. The cerebral functions are suspended, only the lower centers, presiding over circulation and respiration, continue to act. Out of this condition, and without interference, the patient will gradually emerge. If, however, the inhalation be continued, the organic functions will be paralyzed, causing the heart's action and respiration to cease.

#### MODES OF DYING FROM ANÆSTHETIC VAPORS.

1st. Death is sudden, and occurs soon after the inhalation is begun, and is explicable on the theory that the first vapor that reaches them paralyzes the cardiac motor ganglia, already in a state of abnormal susceptibility from some unknown cause.

2d. By the second form, called "epileptiform syncope," death ensues in the state of rigidity preceding muscular relaxation, and is due to a tetanic fixation of the respiratory muscles and consequent interference with the pulmonary circulation, accumulation of blood on the venous side, and arrest of the heart's action. In these cases respiration ceases before the action of the heart is discontinued.

3d. By paralysis of the respiratory muscles. Death takes place during the stage of complete muscular relaxation, and the action of the heart continues for some seconds after the cessation of respiration.

4th. By paralysis of the heart. This also takes place during complete insensibility. The motor gangliæ are paralyzed and suddenly the heart ceases to act, the respiration continuing for a short time longer.

5th. This mode of dying is made up of two factors; depression of the functions by continued narcosis, and the shock of the injury or operation. Death may occur during the giving of the anæsthetic or it may occur afterward.

CONDITIONS OF THE ORGANISM RENDERING THE USE OF  
ANÆSTHETICS DANGEROUS.

An operator could not be guilty of a more serious and unpardonable error than to begin the administration of an anæsthetic without first making a thorough physical exploration of the patient to detect the presence of any contra-indication that might exist. Experience has shown that old drunkards are peculiarly unfavorable subjects. When tumor or abscess of the brain exist it is dangerous to give anæsthetics. Instances of death under these circumstances are relatively numerous. Very much enlarged tonsils, swollen epiglottis, and œdema of the glottis are contra-indications, but not insuperable to the use of anæsthetics. Emphysema of the lungs is so frequently associated with ischæmia of the arterial, and engorgement of the venous side of the systemic circulation and with dilatation of the right cavities of the heart, it must be considered an unfavorable condition in which to give an anæsthetic. Fatty change in the muscular structure of the heart must also be considered a dangerous contraindication, for more deaths have resulted from this cause than any other. The ordinary anæsthetics have been administered with safety in phthisis and valvular disease of the heart, if its muscular substance and contained gangliæ are free from pathological change. Experience has abundantly shown that those reduced by disease and the feeble bear anæsthetics better than the healthy and robust, and that women and children are better subjects than robust men, and that anæsthetics are safer when given for operations for disease than for injury.

INCOMPLETE ANÆSTHESIA IS A CONDITION OF DANGER.

Numerous accidents have occurred from the use of anæsthetics for trivial operations—notably for the extraction of teeth—in which but a partial anæsthesia was produced. In those cases the heart was enfeebled by the anæsthetic

narcosis, and is suddenly paralyzed by the reflex shock proceeding from the perypheral injury. The district of tissue supplied by the fifth pair of nerves in an especially dangerous region, owing to the intimate association of the nucleus of the fifth with that of the pneumogastric nerves. By far the greatest number of fatal cases have occurred from neglect to thoroughly anæsthetize the patients before proceeding with the operation. If, in many of the cases, this rule had been more carefully observed, doubtless many unfortunate occurrences might have been averted. It cannot be impressed upon our minds too strongly that it is never safe to proceed with an operation of *any* kind until complete insensibility is produced.

#### MODES OF CONDUCTING THE INHALATION.

After carefully ascertaining that none of the contraindications mentioned above exist, the patient may be prepared for the inhalation of the vapor. An anæsthetic should never be given immediately after a meal, as vomiting is usual as the narcosis subsides, and as the insensibility of the glottis persists for some time afterward, particles of food may be lodged in the chink and produce suffocation. Several instances of this kind have been reported. On the other hand, it is bad practice to give an anæsthetic after prolonged fasting, as the depression thus produced may be an influential factor in producing a fatal result.

Before the inhalation is commenced, it is important to premise with a subcutaneous injection of morphine, as when the morphine influence is produced the inhalation will proceed quietly, without the struggling and coughing and spasmodic breathing which so materially interfere with the administration of the anæsthetic. The morphine, subcutaneously, also lessens materially, if not prevent entirely the stage of rigidity and spasm. Besides the foregoing pre-eminent advantages derived from the use of morphine there can be no doubt that this agent antagonizes the par-

alyzing influence of the anæsthetic on the cardiac and respiratory centers, and prevents the subsequent depression due to the continued action of the anæsthetic and the operation. The addition of about the 1-120 of a grain of atropine (the active principle of belladonna) to the morphine greatly promotes its good effects. When the anæsthetic is about to be administered the patient should be placed in the recumbent position, with an abundant supply of fresh air. All hindrance to respiration must be removed, the clothing about the neck and thorax should be well loosened. All appliances for resuscitation should be conveniently at hand, but not ostentatiously paraded before the patient.

The simplest apparatus only is necessary: a cone of stiff paper, lined with lint or felt, and large enough to cover the mouth and nose, answers every purpose for the administration of ether. When ether is inhaled the atmosphere is as far as possible excluded, so that anæsthesia may be produced more promptly. The important point to bear in mind when using chloroform is to secure such an admixture of air as that the amount of chloroform vapor may not exceed  $3\frac{1}{2}$  per cent. If this rule is observed, the form of inhaler is of no importance. The mouth and nose should be protected from the irritant action of the chloroform by an emulsion of oil. When administering chloroform by any of the methods in use it should not be forgotten that it has a density and weight four times that of the atmosphere, and that consequently when the inhaler is held closely over the mouth the air is excluded and the patient may be inhaling little more than chloroform. During the administration of ether, attention should be given to the state of the respiratory organs, for the arrest of respiration is the only source of danger. When chloroform is being given both respiration and circulation must be closely regarded.

#### MEANS OF REMOVING DANGEROUS SYMPTOMS.

Suspension of the heart's action is to be met promptly



by the withdrawal of the anæsthetic and the inversion of the patient; failure of respiration, by forcibly drawing out the tongue, by artificial respiration, and faradization of the chest muscles, Artificial warmth should be applied to the surface of the body, and cold douching, so commonly practiced, should be prohibited. Amyl nitrate, by inhalation or subcutaneously, has proven very successful in some cases. Schirmer's method of arousing the patient is by irritating the nasal mucous membrane by a roll of paper made more exciting by dipping it into aqua ammonia. The hypodermic use of brandy or whiskey has given happy results in many instances.

As nitrous oxide gas is of greatest importance to the dental surgeon, the remainder of my remarks will be confined to this substance. Nitrous oxide gas, as you all know, is a colorless, inodorous gas, having a slightly sweetish taste, and a S. G. of 1.527. It consists of one equilibrium each of nitrogen and oxygen. It increases the rate of combustion of inflammable substances. Water at 60° F. absorbs about three-fourths of its bulk of the gas. By pressure and cold, the gas may be liquified, and can then be stored in suitable vessels for transportation and use. The quantity taken up by cold water can be greatly increased by pressure, and yield it up on heating.

The first effects produced by inhaling nitrous oxide gas are a decided subjective dizziness, and whirring noises in the ears, tingling and loss of sensation throughout the body. Extraordinary illusions beguile the senses, and the intoxicated subject suddenly breaks forth in expressions of joy or grief, declamation, etc., or may manifest a pugnacious tendency, assaulting those about him. The countenance assumes a most alarming appearance, frightful to those who are unaccustomed to witnessing such sights. The face becomes deadly pale; the respiration, at first shallow, soon becomes a stentorous character, the jaw becomes fixed, the eyes protrude, and the palor of the face is soon replaced by a bluish and purplish tint. As the effects pass off rapidly

the subject is surprised and ashamed to find himself in some ridiculous position quite foreign to his usual demeanor. When used for operative procedure, the inhalation of the gas is forced, and as the stage of unconsciousness is brief, what is to be done ought to be done promptly, in order that the patient may not experience the ill effects produced by prolonged inhalations of the anæsthetic.

So far as external phenomena afford any indication of the nature of the action of nitrous oxide gas, the condition produced is one of asphyxia. The blood ceases to receive its needed supply of oxygen, carbonic acid gas accumulates, and the centers of conscious impression are rendered inactive by the deficient amount of oxygen and the excess of carbonic acid gas. The fact should be remembered that the gas may be absorbed into the blood if the inhalation be too prolonged, and thus produce very serious symptoms. Fatal cases have certainly occurred which can with propriety be attributed to the toxic action of the gas; and many cases have been reported in which nervousness, vague mental symptoms, and headache have been experienced after the inhalation.

There are various other anæsthetics which have their advocates; notably among them are ethel, bromide and bichloride of methylene, but as these only occupy a position secondary to the ones I have discussed, I will not detain you longer by my remarks.--*Texas Dental Journal*

*To be continued.*

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ARTICLE V.

RESOLUTION OF AMERICAN MEDICAL ASSOCIATION.

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The American Medical Association, which met in Chicago recently, passed the following resolutions:



RESOLVED, That the regular graduates of such dental and oral schools and colleges as require of their students a standard of preliminary or general education, and a term of professional study equal to the best class of the medical colleges of this country, and embrace in their curriculum all the fundamental branches of medicine, differing chiefly by substituting practical and clinical instruction in dental and oral medicine and surgery, in place of practical and clinical instruction in general medicine and surgery, be recognized as members of the regular profession of medicine, and eligible to membership in this association on the same conditions and subject to the same regulations as other members.

Dr. Davis in introducing the resolution said he wished to explain its object. "There are two objects to be had in view; first, to relieve a degree of embarrassment that exists between the regular profession as we consider it, and the profession of dentistry. The department of dental and oral surgery is a part of the profession of medicine as much as the department of ophthalmology or otology or any other ology. Our teeth and mouths are a part of our system as much as any other part, and are used more than any other part. The embarrassment is this: That in history the development of dentistry originated mostly in mechanical operations. Steadily it has advanced and in years gone by—quite a number of years ago—our lamented Dr. D. Gross made a proposition that an oral and dental section be provided as a section in this association. It was seconded by Dr. Sayre and myself, and it was organized. The International Medical Congress of 1881 provided a section for dental and oral surgery. The congress to be held in Washington has done the same thing, and it will be one of the most thorough and best organized sections of the congress. There is an embarrassment in this respect. It is to know just who and by what line of demarcation those engaged in that department shall be recognized as members of the regular profession. Now it is proposed to make a line and draw it where this resolution says that those who are qualified by general education and a term

of study equal to the best medical colleges, a curriculum embracing the entire fundamental principles of medicine with the provision that instead of special instruction in clinical surgery, instruction may be had in dental and oral surgery, such shall be recognized as members of the profession of medicine. It will take away a sort of embarrassment. There is a more far-reaching and more valuable underlying object in this resolution, and that is that to be recognized as a member of the profession, if this resolution is adopted by this body, they must have the education received in schools that require these requirements, it makes a strong lever to lift up the course of study in the dental schools. Such are my reasons for bringing up the resolution. I will say nothing more on the subject."

The motion was made that the resolution be adopted by the association, and it was carried unanimously.—*Ez.*

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ARTICLE VI.

FLORIDA DENTAL LAW.

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Following is the text of the bill entitled "an act to provide for the appointment of a board of examiners of dentists, and to regulate the practice of dentistry in the State of Florida," which has been passed by the Legislature of the State and become a law :

*Be it enacted by the Legislature of the State of Florida:*

SECTION 1. That from and after the passage of this act it shall be unlawful for any person to engage in the practice of dentistry in the State of Florida unless said person shall have obtained a certificate from a board of dentists, duly authorized and appointed under the provisions of this chapter to issue license.

SEC. 2. Be it further enacted, That the board of examiners shall consist of five (5) dental graduates or practitioners of dentistry, appointed by the Governor, and who

are members in good standing of the Florida State Dental Association; provided, that said graduates or practitioners have been practicing in the State of Florida for a term of not less than three (3) years. Said board shall be appointed to serve two (2) years. The president of said board shall have power to fill all vacancies in said board for unexpired terms.

SEC. 3. Be it further enacted, That it shall be the duty of this board: First, to meet annually at the time of the meeting of the Florida State Dental Association, or oftener at the call of any three members of said board; thirty days' notice must be given of the annual meeting; secondly, to prescribe a course of reading for those who study dentistry under private instructors; thirdly, to grant licenses to all applicants who undergo a satisfactory examination; fourthly, to keep a book in which shall be registered the names of all persons licensed by said board to practice dentistry in the State of Florida.

SEC. 4. Be it further enacted, That three members of said board shall constitute a quorum for the transaction of business, and should a quorum not be present on the day appointed for their meeting, those present may adjourn from day to day until a quorum is present.

SEC. 5. Be it further enacted, That one member of said board shall have the power and may grant a license to an applicant to practice dentistry until the next regular meeting of said board, when he shall report the fact, and which time the temporary certificates shall expire, but such temporary certificates shall not be granted by a member of the board after the board has rejected the applicant.

SEC. 6. Be it further enacted, That any person who shall, in violation of this act, practice dentistry in the State of Florida, shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than twenty-five dollars nor more than five hundred dollars; provided, that nothing in this act shall be construed so as to prevent any person from extracting teeth; and provide

further, that none of the provisions of this act shall apply to regularly licensed physicians and surgeons in practice at or prior to the passage of this bill.

SEC. 7. Be it further enacted, That every person practicing dentistry in the State of Florida shall, within six months after the passage of this act, register his name, together with his post-office and the date of his certificate, in the office of the clerk of the circuit court of the county in which he practices, and shall, on the payment to such clerk of a fee of fifty cents, be entitled to receive from him a certificate of such registration.

SEC. 8. Be it further enacted, That every person practicing dentistry in the State of Florida at or prior to the passage of this bill shall be entitled to receive from the board of examiners a certificate to practice without undergoing an examination, on application by letter or otherwise; provided, that all such persons make application to said board within six months after the passage of this act.

SEC. 9. Be it further enacted, That all laws and parts of laws in conflict with this act be and they are hereby repealed.—*Cosmos*.

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ARTICLE VII.

GOLD AT CERVICAL BORDER.

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BY WM H. COOKE.

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Much has been said of the failure of gold at the cervical margins in very large approximal cavities. The writer does not remember of having heard this complaint when soft gold was used exclusively.

Incompatibility of gold and dentine, and the shrinkage of gold under the blows of the mallet, have been assigned as causes for this failure. The writer does not accept the incompatible theory. In 1856 Mr. H—asked for treatment

of upper first molar. There was extensive decay from the cervical wall to and including about one-third of grinding surface. Both horns of the pulp were exposed. The pulp was extirpated, the palatine canal, pulp chamber and cavity of decay filled with soft gold. Saw Mr. H—in 1876; found the tooth in normal condition, and no decay at cervical border. This case is one out of many, for at that day amalgam was not a popular material with which to fill teeth, being used only in teeth that were popularly termed "old shells," and in cavities that could not be made accessible. At that day the average dentist was required to fill many times more large cavities in the bicuspid and molars with gold, for the same class of patients, than at the present, and had there been failures at the cervical wall as a rule, instead of the exception, we would have heard of it.

In 1868 Mr. C—presented two superior bicuspid which had been filled with soft gold in 1844, by John Fouche, dentist, of Knoxville, Tennessee. These two teeth were widely separated with shoulders left at the gums. The cavities extended from these shoulders to near the grinding surface and were well preserved. Mr. C— requested these shoulders removed and the cavities filled with cohesive gold, and contoured in such manner as to come in contact only at the grinding surface. The shoulders were filed away and cavities shaped as deemed suitable at the cervical wall, dovetails cut in the grinding surface, and then filled with cohesive gold under the mallet, and contoured as Mr. C—wished, and to the entire satisfaction of the writer. A little more than a year afterward the patient returned for examination of those "*beautiful gold plugs.*" To the dismay of the writer the cervical and side margins had failed and the gold was only held in position by the dovetails in the grinding surface. Removing the gold with considerable difficulty the cavities were prepared and refilled with soft gold and finished with cohesive gold as follows; after removing the decay the margins were chiseled as nearly square as possible. Abbey's soft foil No. 4 was cut into half sheets and



told into ribbons wider than the approximal depth of the cavities. These ribbons were rolled into moderately tight cylinders of sufficient size for two to cover the floor when placed in a horizontal position, the ends protruding outside the walls. These were forced in position by hand pressure and others added in like manner till the upper third of the cavities were filled. With a round, sharp-pointed instrument holes were made perpendicularly through the gold to the bottom of the cavities and filled with tightly rolled cylinders driven in with the mallet. This was continued as long as the instrument would penetrate the gold. The protruding ends of the cylinders were consolidated by hand pressure, trimmed and burnished before proceeding further. The middle third was filled and finished after the same manner. The upper third of both cavities were then built up with cohesive gold, cut apart with a thin file, and the gold rounded, giving the margins a good finish and leaving the gold nearly or quite touching at the grinding surface.

These teeth were examined eight years afterward, and no disintegration of tooth substance found.

These cases are referred to as illustrations why the writer concludes that soft gold properly consolidated will preserve the cervical wall as well or better than any other material, and is not incompatible with tooth substance.—*Texas Dental Journal*.

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## Editorial, Etc.

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THE SOUTHERN DENTAL ASSOCIATION.—This Association met last week at Fortress Monroe, Old Point Comfort, and was one of the most largely attended and interesting meetings ever held. Between three and four hundred dentists

were in attendance, and everything passed off in the most satisfactory manner. The late President, Dr. W. W. H. Thackston, that "Old Virginia Gentleman," can congratulate himself after presiding over such a body of dentists as congregated in 1887 at "Old Point."

We are pleased to announce the election of our old (not in years of age, but in length of friendship) friend, Dr. B. H. Catching, of Atlanta, Ga., editor of *Southern Dental Journal*, to the presidential chair for the ensuing year. Especially is this gratifying on account of the many efforts of Dr. Catching in behalf of the Southern Dental Association, and also from the fact that a vain effort was made to elect to that position a gentleman who obtained his degree of D. D. S. from the so-called Delaware (Wisconsin) College.

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THE INTERNATIONAL MEDICAL CONGRESS.—The Ninth Annual Session of this Congress now in session in Washington City is largely attended, and the meetings have proven very interesting and instructive. The meetings of the Dental Section have been very well attended, and the clinics of a high order. *The Medical Record*, Wm. Wood & Co., publishers are to be commended for their generosity and kindness in supplying all the medical and dental journals of the country with proof sheets of the proceedings which will be appreciated by all who receive them as furnishing an excellent account of the proceedings of this distinguished body of gentlemen. In the next number of the JOURNAL we will furnish our readers with the proceedings of the Dental Section.

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DEATH IN A DENTAL OFFICE.—For the past week, Mr. Hoffman has been suffering with neuralgic pains in the jaw. Thinking that this was due to several decayed teeth, he determined to have them drawn. About 4 30 yesterday afternoon he entered Dr. Melancthon M. Ritchie's office and requested that gentlemen to "pull the aching tooth." Mr. Hoffman at the same time asked the doctor to "give him something," saying that he dreaded "tooth pulling." Dr. Ritchie examined

his mouth and told him that he did not think it necessary to administer an anæsthetic, but Mr. Hoffman insisted that he could not stand the operation without it. Dr. Ritchie then acceded to his request and administered an anæsthetic, compounded as follows: Sulphuric ether two parts, and one part chloroform. As near as could be found out, the dose given was about one ounce. Mr. Hoffman yielded readily to the anæsthetic and two teeth and one root were extracted when the doctor noticed symptoms of collapse. He immediately applied all known resuscitants and sent to a neighboring druggist for aid. He first called on Dr. C. A. Rahter, but found that he was not in his office. He then called upon Drs. I. Elmer Cook, Fred. Coover and P. C. Snyder. These gentlemen repaired to Dr. Ritchie's office at once and did everything within their knowledge to resuscitate the patient. All remedies known to the science were applied, but failed to save him from the collapse into which he had fallen, and he expired on the chair to which he had gone for relief. Thus a life that cheered the homes of brother, sister and friend, was snapped off in its very prime, and what was yesterday bright with smiles and sunshine, is to day clouded with sorrow and gloom.

When a *Call* reporter called upon Dr. Ritchie, he found him much distressed over the sad affair, but perfectly willing to give the details.

"Doctor; I feel sorry that this has occurred, but I want to print a true story and beg you will pardon me if I press you close with questions "

The doctor replied, "I am only too glad to give you just what occurred. It is a most lamentable thing for me and I am only thankful that my position may be fairly put before the public."

What did you administer, doctor, and what were the primary symptoms you noticed," said the pardonable inquisitive reporter.

"Well," said the doctor, "to do myself justice, I should say that Mr. Hoffman came to me suffering with acute toothache. He said that he had suffered so much that he could not attend to his duties, and wanted the troublesome member taken out. He insisted, however, that he could not stand the



shock unless he could have 'something.' I advised him that the tooth could be removed without an anæsthetic, but he insisted that I should 'give him something.' I then concluded to administer an anæsthetic. I gave him a compound of two parts of sulphuric ether and one part chloroform, and had only given him about one ounce. He yielded readily to the drug and I extracted two teeth and one root. There were two roots yet remaining which I desired to extract, but after getting rid of those spoken of he sat upright and expectorated. Then he laid back and I thought he hadn't enough and was about to administer more of the compound when I observed such symptoms as led me to desist. His face was overspread with palor and he bore positive signs of exhaustion. This, of course alarmed me, and I took immediate steps to resuscitate him. At this time he was in a semi-recumbent chair. His breathing became irregular and spasmodic. He showed such alarming symptoms that I at once called to my aid such resuscitants as are most generally resorted to under like circumstances. I laid him in a recumbent position and for a moment he seemed to revive, but did not open his lips. I called in my neighbor, William Roe, the druggist, and asked him to supply me with such resuscitants as I might need. I tried artificial respiration, dashing the face with water, and slapping the chest with a wet towel. I first sent young Mr. Roe for Dr. C. A. Rather, but he was not at home. Dr. I. Elmer Cook, Dr. Fred. Coover and Dr. Snyder, however, came to my assistance, and were with me when Mr. Hoffman died. I think the real cause of his death was some trouble on the brain. The condition of the heart was good throughout. His heart beat at least forty minutes after the first inhalation. To my best judgement there was nothing wrong with his heart."

"Did you ever treat him before?" queried the *Call* representative.

"No, I never did."

"Have you administered ether or chloroform or both frequently?"

"Yes," replied the doctor, "I have frequently given from three to six times the quantity in my practice without ever before experiencing any bad results. You see I used to practice

in Boiling Springs and Carlisle, and there one must do all kinds of work. So-to-speak the family physician is dentist, surgeon and physician. I am satisfied that the closest examination will vindicate me from all the abnoxious and disagreeable features of this case.

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## Monthly Summary.

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• **TOXIC EFFECTS OF LEAD.**—Mr. Wynter Blyth has had an opportunity of examining portions of the bodies of two out of five persons who have at different times died more or less suddenly from, as it is believed, the effects of lead poisoning. In one case he separated about a third of a grain of sulphate of lead from the liver and about a thirteenth of a grain from one kidney, besides finding lead qualitatively in the brain. In the other he was able to examine the brain with more minuteness, and estimated that here the cerebrum contained about a grain and a half and the cerebellum about a quarter of a grain of sulphate of lead. Mr. Blyth went on to remark, in the paper he read to the Chemical Society of London on these investigations: "There has hitherto been no reasonable hypothesis to explain the profound nervous effects of the assimilation of minute quantities of lead, but if it is allowed that lead forms definite compounds with essential portions of the nervous system, it may then be assumed that in effect it withdraws such portions from the body; in other words, the symptoms are produced not by poisoning in the ordinary sense of the term, but rather by destruction—a destruction it may be, of important nerve centres.—*The Lancet*."

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**ONE OBJECTION TO PLASTIC FILLINGS.**—Of the cements, it may be truly said that, in approximal cavities especially, they soon become a source of annoyance. However skillfully

contoured, they become worn by attrition in a few weeks or months to a degree that allows of food crowding into space or invites contact of the tongue with the slightest projection of enamel edge. To a nervously-constituted person this is a serious annoyance. At the same time the filling may appear nearly perfect to the eye of the dentist. Only those who, like the writer, have suffered this annoyance, can fully appreciate it.—*Cincinnati Medical and Dental Journal*.

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THE AMERICAN MEDICAL ASSOCIATION RECOGNIZES DENTISTRY AS A SPECIALTY IN MEDICINE.—*Resolved*. That the regular graduates of such dental and oral schools and colleges as require of their students a standard of preliminary or general education, and a term of professional study equal to the best class of the medical colleges of the country, and embraces in their curriculum all the fundamental branches of medicine, differing chiefly by substituting practical and clinical instructions in dental and oral medicine and surgery, in place of practical and clinical instruction in general medicine and surgery, be recognized as members of the regular profession of medicine, and eligible to membership in this association on the same conditions and subject to the same regulations as other members.

Dr. Davis, in introducing the resolution, said he wished to explain its object. There are two objects to be had in view: first, to relieve a degree of embarrassment that exists between the regular profession, as we consider it, and the profession of dentistry. The department of dental and oral surgery is a part of the profession of medicine as much as the department of ophthalmology, or otology, or any other ology. Our teeth and mouths are a part of our system as much as any other part and are used more than any other part. The embarrassment is this: that in the history of dentistry it was a little, if anything, more than a mere mechanical pursuit. Steadily it has advanced as the years have gone by. A number of years ago, our lamented friend, Prof. S. D. Gross made a proposition that an oral and dental section be provided in this association. It was seconded by Dr. Sayre

myself, and it was organized. The International Medical Congress of 1881 provided a section for dental and oral surgery. The Congress to be held in Washington has done the same thing, and it will be one of the most thorough and best organized sections in the Congress. There is an embarrassment in this respect. It is to know just who and by what line of demarkation those engaged in that department shall be recognized as members of the regular profession. Now it is proposed to make a line and draw it where this resolution says, that all those who are qualified by general education and a term of study equal to the best medical colleges, a curriculum embracing the entire fundamental principles of medicine with the provision that instead of special instruction in clinical surgery, instruction may be had in dental and oral surgery, such shall be recognized as members of the profession of medicine. It will take away a sort of embarrassment. There is more far-reaching and more valuable underlying object in this resolution and that is to be recognized as a member of the profession, if this resolution is adopted by this body, they must have the education received in schools that require these requirements. It makes a strong lever to lift up the course of study in the dental schools. Such are my reasons for bringing up the resolution. I will say nothing more on the subject.

The motion was made that the resolution be adopted by the Association, and it was carried unanimously.

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TREATMENT OF DIARRHŒA BY IODOFORM AND CHARCOAL.—Picchini treated eight cases of diarrhœa, with symptoms of fermentation, with the following:

Iodoform,	-	-	-	-	grs. 9.
Ether,	-	-	-	-	̄ 3℥.
Vegetable charcoal, finely powdered,	-	-	-	-	̄ 3℥.
Glycerin, ad.	-	-	-	-	̄ 3 12.

The iodoform must be dissolved in the ether, and the powdered charcoal thoroughly mixed. After the ether has evaporated, the glycerin should be mixed. To take in twenty-four hours, by teaspoonful or tablespoonful, suspended in a glass of water.—*Journal de Medecine.*

**HYPNOTIC EXPERIMENTS IN PARIS.**—A distinguished company of Parisians recently witnessed some interesting experiments of a newly discovered hypnotiser. M. Moutin does not put people to sleep, but makes them obey his will while thoroughly awake. He began by choosing his subjects among the people who presented themselves, placing his hand on the nape of the neck. While talking to them he inquired whether they felt an unusual heat under his hand. In an affirmative answer was given he knew he had a good subject, and was telling him to stand up straight, soon brought him on his knees, by simply placing one hand lightly on his back and holding the other in front of his knees. One gentleman, well known in Parisian society, was dragged around the room among the spectators by M. Moutin, who placed that gentleman's hand first on his shoulder and then on his head, and told him to follow him. When they got back to the platform he placed the same gentleman, when sitting on the ground, that he forbade him to rise. Notwithstanding the most strenuous efforts he could not rise until he had received the magnetiser's permission. One of the women on the *Gaulois* was operated on in a yet more astonishing manner. Placed at the extremity of the long hall, with his back turned to M. Moutin, he was told to do all he could to prevent himself being dragged backwards toward the platform. He used what seemed to be almost superhuman efforts to stand where he was; but soon his legs began to tremble violently, and in spite of all he was soon walking backward toward the operator. After that everybody was made to laugh heartily by the same gentleman being made to dance in a most amusing manner. M. Moutin also fought a mock duel with him. Asking for two walking sticks he gave one to the gentleman, and, after crossing swords with him, paralyzed his arm by his will. After releasing his adversary from that disadvantageous position he was told by M. Moutin that he desired him to touch him with his stick. The operator failed in this instance for after a prolonged effort, during which the journalist seemed to strain every nerve and muscle in his body, he at last touched M. Moutin on the chest. The operator, however, won great applause by recommending the experiment. He stood perfectly still, and offered, as before, no resistance, but his will or magnetic power. The gentleman, with his stick, struggled, so to say, against the air, but he failed to touch the operator. One of the ladies present was then told by M. Moutin, while she was sitting among the spectators, that he defied her to say "Nebadnezar." It was ridiculous in the extreme to hear her try in vain until the operator gave her permission to say the word. The same lady was evidently a good subject, for M. Moutin placing two chairs in the middle of the platform sat down on one, and then told the lady to come and sit down on the other and lean her head on his shoulder. She protested, but in a few minutes she was seized with the most violent trembling in her outstretched arms. She got up, and was threaded her way amongst the spectators in what seemed to be a most

ous trance, for she trembled most violently. Some people thought she would trip on the platform steps, but M. Moutin, who was sitting quietly awaiting her arrival, reassured them by saying, "She cannot fall; I forbid her to fall." She sat down on the chair, and, when there seemed determined not to put her head on the shoulder of the operator, but in a few moments she closed her eyes and let her head fall. At the same instant M. Moutin started to his feet, and, blowing in her face, restored her instantly to consciousness. Other equally astonishing experiments were made by him on people whom it is difficult to suppose could be accomplices to a trick.—*Pacific Record of Medicine and Surgery.*

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**SPIDERS.**—In spiders the head and thorax are bound together in one piece, and the abdomen connected to it by a very slender neck. Though spiders are provided with hollow poison-fangs, there is no proof that the American species, at least, are poisonous. The jaws of the smaller varieties are too delicate to take hold of the human flesh; and the probability is that even the largest ones are entirely harmless. The female spider is the most important member of the family. The males are small and inconspicuous, and in one case a female was found amid the bodies of a large number of her unfortunate husbands, whom she had destroyed and thrown to one side—a perfect female Bluebeard.

The parental love of the spider is very strong. The female carries suspended on her legs, a small bag containing the eggs, which resemble white glass beads. If the bag is pushed away with a straw or stick, the creature will make the most desperate effort to recover it. A spider was once found whose back appeared to have a granulated surface, but upon closer examination showed that she was entirely covered with her young. On trying to shake them off, they attached themselves to their mother by a thread; and on throwing her to the ground, she remained perfectly quiet until they had all pulled themselves back by means of their extemporized cable, and spread themselves over her body as before.

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**A CASE OF REPLANTATION.**—In the month of February, a boy ten years old, while playing ball, had the left superior central knocked out; he picked the tooth up and carried it home to show to his father, who, thinking it might grow, put it back in position, but the socket was so torn up that it would not stay. He made the little fellow keep his mouth closed most of the time and kept the tooth in that way for ten days, when he brought the boy to me. I found no union whatever, but much inflammation and suppuration, and quite offensive. I saw at once that it would not be a success in that condition, so I removed the tooth and told him to call again in two weeks. He did so, and I opened the socket, removed the pulp from the tooth, filled the root with lead, and replaced the tooth with splendid results.—*Dr. E. F. Adair.*



**MYRTOL.**—This is a volatile oil obtained from myrtle leaves and possesses their characteristic odor. Its taste is pungent and slightly acrid, succeeded by a feeling of coolness. It is said to be a splendid disinfectant and an energetic antiseptic, to stimulate the digestive functions without upsetting the stomach, and to increase the appetite. In moderate doses myrtol acts as a sedative to the nervous system. It is eliminated by the respiratory and urinary passages. In order to obtain the best results in diseases of the respiratory passages, it should be employed with a view to combating subacute or chronic catarrhal affections, or it may be given at the termination of an acute attack of bronchitis when the fever has subsided. Another indication for its employment is an abundant opaque mucopurulent secretion. In these cases the secretion is diminished and rendered less purulent. The average daily dose given is 90 centigrammes in capsules, taken after meals in three doses of 30 centigrammes — *Pacific Record of Medicine and Surgery*.

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**THE ADULTERATION OF CANDIES.**—A well-known writer, who has studied, gives the following account of his investigations on this subject: "Terra alba, or white earth, is used largely in the adulteration of candies. The body of candies, the coating of almonds and lozenges are often made from this earthy material. I have seen an ounce of lozenges dissolved in water in which two-thirds of an ounce was white earth. Pine-apple flavor is often obtained from rotten cheese and nitric acid. Poisonous coloring is very much used for candies. One of the commonest is 'candy lot,' into which arsenic largely enters. Liquorice drops for the throat are sometimes made of poor brown sugar, glue and lamp-black, flavored with liquorice." It is the duty of mothers to protect their children from the baneful effects of such stuff. The safest way to accomplish this is to keep candies of every kind out of their reach. — *Herald of Health*.

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**PULSE IN MORPHINOMANIA.**—Curious sphygmographic tracings obtained in morphine-mania were presented to the French Academy of Sciences in the name of Messrs. Ball and Jennings. The authors point out three types in these tracings: One corresponding to the period of satisfaction, one to the period of desire and one to the period of the peculiar feverish condition resulting from too long a privation of morphine. In all cases a long, flat elevation is observable, following ascension caused by the systole, and so peculiar that, according to the authors, morphine-mania might be detected in a person who, for a reason, should try to conceal his vice. It appears therefore that alkaloid not only leads to a perturbation in the cerebral faculties, but disturbs the functions of all the viscera.

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ARTICLE I.

NINTH INTERNATIONAL MEDICAL CONGRESS.

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[Held in Washington, D. C., September 5, 6, 7, 8, 9 and 10, 1887.]

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MONDAY, SEPTEMBER 5TH—FIRST DAY.

The Congress assembled in Albaugh's Opera House, and was formally opened at 11 A. M., by His Excellency GROVER CLEVELAND, President of the United States, who said: "I feel that the country should be congratulated to-day upon the presence at our capital of so many of our own citizens, and those representing foreign countries who have distinguished themselves in the science of medicine, and are devoted to its further progress. My duty in this connection is a very pleasant and a very brief one. It is simply to declare that the Ninth International Medical Congress is now open for organization and for the transaction of business."

The address of welcome was delivered by Hon. Thomas F. Bayard, Secretary of State. In the name of his fellow-countrymen he expressed gratification at the visit of the



delegates to Washington. The world is becoming acquainted and international intimacy is growing; a spirit of common brotherhood is increasing so that the word "stranger" will soon be obliterated from the vocabulary of civilization. If letters constitute a republic, science is a democracy. In the United States individual enterprise has produced great scientific institutions without the aid or interference of government. The proceedings of the Congress will be watched with interest by the sixty million people of this country.

Responses were made by the following gentlemen :

Dr. William H. Lloyd, of the Royal Navy; Dr. Leon Le Fort, of France; Professor Unna, of Germany; Professor Semmola, of Italy; Dr. Charles Reyher, of Russia.

Dr. Lewis A. Sayre, of New York, occupied the chair during the delivery of the address of the President of the Congress.

Dr. Davis began by paying an eloquent tribute to the memory of Austin Flint, M. D., LL. D., and continued as follows :

With a full consciousness of my own deficiencies, and still with a heart overflowing with gratitude, I thank you for the honor you have bestowed in selecting me to preside over the deliberations of this great and learned assembly. It is an honor that I appreciate as second to no other of a temporal nature because it has been bestowed, neither by conquest nor hereditary influence, nor yet by partisan strife, but by the free expression of your own choice.

The living human body, the chief object of your solicitude, not only combines in itself the greatest number of elementary substances and the most numerous organs and varied functions, so attuned to harmonious action as to illustrate the operation of every law of physics, every known force in nature, and every step in the development of living matter from the simple aggregation of protoplasm constituting the germinal cell to the full-grown man, but is placed in appreciable and important relations with the

material objects and immaterial forces existing in the world in which he lives.

Hence a complete study of the living man, in health and disease, involves a thorough study, not only of his structure and functions, but more or less of every element and force entering into the earth, the air, and the water, with which he stands in constant relation.

The medical science of to-day, therefore, embraces not only a knowledge of the living man, but also of such facts, principles, and materials gathered from every other department of human knowledge as may increase your resources for preventing or alleviating his suffering and of prolonging his life.

The time has been when medical studies embraced little less than the fanciful theories and arbitrary dogmas of a few leading minds, each of which became for the time the founder of a sect or so-called school of medicine, with his disciples more or less numerous. But with the development of general and analytical chemistry, of the several departments of natural science, of a more practical knowledge of physics, and the adoption of inductive processes of reasoning, the age of theoretical dogmas and of medical sects blindly following some more plausible leader passed away, leaving but an *infinitesimal* shadow yet visible on the medical horizon.

The address closed with an appeal for the collective investigation of the phenomena of disease.

#### SECTION ON DENTAL AND ORAL SURGERY.

Jonathan Taft, M. D., of Cincinnati, O., President.

*Secretaries*—A. M. Dudley, M. D., of Salem, Mass.; F. H. Rehwinkel, M. D., of Chillicothe, O.

MONDAY, SEPTEMBER 5TH—FIRST DAY—AFTERNOON SESSION.

The President welcomed those present.

Dts. I. V. Metnitz, of Austria; B. McLeod, of Scotland; and Greverts, of Holland, replied in behalf of the countries they represent.

delegates to Washington delivered his address, in which he acquainted and international dentistry in the last fifty years common brother saying that although the past record "stranger" will the goal is not yet reached. H civilization. through those present, to work in a democracy.

produce a yet higher standard.  
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*Dr. R. J. Porte, of Cincinnati, O., read a paper on chronic pyæmia from dental origin."*

*The history of the case is as follows: The patient, a male, good constitution and habits, suffered for the last thirty years from neuralgia, besides having constant recurring furuncles and eruptions in various parts of the body, which would often for months become running abscesses. He experienced burning and itching eruptions on hands and feet, which would finally change to stubborn ulcerations. His bowels were either stubbornly constipated or exhaustingly loose. He suffered from frequent rigors and febrile attacks of varying intensity, profuse night sweats, retention of urine, serious constriction of the bowels and urethra. Lancinating pains darted from the maxilla of right side to bowels, bladder, limbs, hands and feet, to whatever part that was locally affected at the time. The latter peculiarity, together with the discovery of a little pus exuding from the locality of the wisdom tooth, led to a final correct diagnosis of his case.*

The tooth referred to was extracted, and a speedy and complete recovery followed. As other sources leading to pyæmia and having their starting-point in the oral cavity may be mentioned pyorrhæa alveolaris, alveolar abscess, abscess of the antrum, and dental caries.

The doctor related ten other cases similar to the above, which all yielded to the simple remedy of removing the offending tooth.

Dr. J. Frank Lydston, of Chicago, Ill., said that both physicians and dentists should appreciate the important relation which morbid conditions of the mouth and jaws bear to the general system, and especially those which may be produced by sep-

tion, bear to different general conditions. Septic is quite generally found about the roots of teeth, and, under favoring circumstances, be absorbed into the blood, and there produce disturbances of greater or less degree.

The paper was further discussed by Drs. Walker, of London, England; Barrett, of Buffalo, N. Y.; W. J. Younger, of San Francisco, Cal., and Chance, of Oregon.

TUESDAY, SEPTEMBER 6TH—SECOND DAY—MORNING SESSION.

Dr. William Carr, New York, N. Y., gave a *clinic* on the "treatment of fractures of the maxillæ with modified interdental splint."

The majority of fractures of the inferior maxilla occur in the body rarely at the symphysis menti, but usually directly anterior or posterior to the mental foramen. A noticeable fact in connection with these fractures is that the victim rarely applies for treatment for several days succeeding the injury. He realizes that some of his teeth are loosened and also that he is painfully bruised, but does not seek surgical aid until he becomes alarmed by the increased inflammatory condition of the parts. There is but little difficulty in establishing a correct diagnosis, as usually the following symptoms are present—great pain in the effort to open and close the mouth, swelling, crepites, inflammation, inability to masticate, and marked irregularity of the teeth.

*Treatment.*—It is identical with that of other fractures, namely, to bring the parts into apposition and retain them firmly until ossification is completed. For treatment of fractures of the maxillæ there is nothing superior to the interdental splint. When properly adjusted, speedy union may be secured without deformity of the jaw or irregularity of the teeth. Before taking the impression a careful examination of the parts should be made. Loose teeth and spicula of bone should be removed, and the parts should then be brought as nearly as possible to their

normal position. An accurate impression should be made with impression-compound or wax. The material used should be as warm as the patient can bear it, in order to prevent unnecessary pain and also to prevent further displacement of the parts. The splint is made of vulcanite and covers all the teeth of the lower jaw, and all the teeth posterior to the canine in the upper jaw—leaving a space of about three or four lines through which the patient may receive nourishment. Small holes are drilled in the splint over the grinding surface of each molar for the purpose of ascertaining whether its adjustment is proper.

The splint should first be adjusted to the sound jaw, then gently bring the fractured jaw into position until it has passed about two-thirds of the length of the teeth—then with a quick, firm motion bring the parts into position. Next apply a four-tail bandage, which should be retained from three to five days; after this time, in the majority of cases, it may with safety be removed during the day but should be replaced at night until the removal of the splint. The patient should be furnished with an ordinary rubber syringe, and instructed to keep the mouth thoroughly cleansed. For disinfectants I use peroxide of hydrogen three per cent. solution, or a solution of bisulphate of soda in the proportion of 3 j to 3j, of water.

In ordinary cases the splint should be retained for three or four weeks, according to the physical condition of the patient—unless unforeseen complications should arise. The application of the splint, combined with thorough cleanliness, will usually be all the treatment required.

The advantages, besides those previously stated, are that the patient experiences but little pain and inconvenience and can, as a rule, attend to his business almost immediately after the splint is applied.

It is not necessary that all the teeth, nor, indeed, that any should be present in the mouth in order to make this splint serve its purpose. In the first case the rubber can be made to take the place of the missing teeth, and in the

latter case a perfect adaptation of the splint to the alveolar ridges can be secured, and will be found to keep the parts in perfect apposition.

Should it be deemed advisable to place a splint in position within an hour or two after seeing the case, one can be constructed entirely of ordinary gutta-percha, with just enough wire inside to stiffen it. Dr. Carr demonstrated this last method—it is very simple and can be made by any surgeon.

A number of gentlemen examined the principle and pronounced it very satisfactory in every way, the main points being its simplicity of construction, its effectiveness, and the ease with which it is adjusted and worn by the patient.

Dr. E. Brasseur, of Paris, France, read a paper on "the use of air in dental therapeutics."

The reader urged that the ordinary means, such as bichloride and biniodide of mercury and carbolic-acid crystals, for destroying microbes in the oral cavity and, especially, in carious cavities of teeth, should be supplemented by the use of hot air.

Dr. C. A. Brackett, of Newport, R. I., discussed the paper at some length, laying considerable stress on the efficacy of crystallized carbolic acid as a germicide in carious cavities in teeth.

Other discussions followed, by Drs. James Truman and W. H. Morgan.

#### AFTERNOON SESSION.

Dr. Junius E. Cravens, of Indianapolis, Ind., read a paper on "the management of pulpless teeth."

This system is based on the proposition that a pulpless tooth is not necessarily dead. The pulp being devitalized, the tooth still retains life through its pericementum. The usual course of treating pulpless teeth with escharotics and irritants cause irritation and final destruction of the pericementum, and the result is that the tooth, instead of being preserved, will act as a foreign body, and will be

thrown off by nature through abscesses; or, worse still, will lead to no end of nervous derangements.

The treatment suggested by the reader is to thoroughly cleanse the pulp canal, and at once hermetically seal it with tin-foil.

The paper was discussed by Dr. Thomas Fillebrown, of Portland, Me. He did not agree with the essayist in the method outlined in the paper. The doctor gave a short synopsis of the method he employs in treating pulpless teeth, which, by the manner in which it was received by the Section, seemed to be the one generally pursued.

Dr. A. W. Harlan, of Chicago, Ill., followed, and likewise objected to the views expressed by the essayist. A dead pulp produces no irritation in the canal; the disease which it causes is beyond. If you could mechanically displace an odor—which the speaker denied—and should then fill the root-canal without any disinfection, disaster would inevitably follow unless there should be a fistulous outlet.

Dr. W. C. Barrett, of Buffalo, N. Y., in discussing the paper, stated whether viewed from the standpoint of pathology or etymology the paper is alike remarkable. That such a mass of absurdities could be presented at a meeting of the world's representatives in dentistry is to me astounding, and I protest against its acceptance as the standard by which to judge the intelligence of American dentists. Why the exploded dogmas of twenty-five years since should be gravely and in all sincerity presented at such a meeting as this is, I must confess, something for which I was not prepared. The assertion that a closed chamber in which exists the septic debris and the products of decomposition of a tooth-pulp should not be opened and evacuated, I can scarcely believe is made in calm earnest. The essayist has exhibited his complete ignorance of the progress of the past century.

Modern antiseptic pathology has taught us certain facts, and among these is the knowledge that the first step in the treatment of aseptic cavities is complete drainage;

second, disinfection and the removal of all the products of disorganization; third, destruction of septic organisms; and finally, the complete sealing of the cavity against further infection. These comprise the essential steps in the treatment of septic root-canals. I will not insult the intelligence of those present by presuming to enlarge upon this and by going into the details of treatment, for this is not a body of tiro. But I do object to a consideration of the subject from the low standpoint of this extraordinary paper.

Dr. T. E. Weeks, of Minneapolis, Minn., read a paper on "matrices as adjuncts in filling teeth."

The essayist reviewed the different appliances for simplifying what would otherwise be very laborious operations. A perfect matrix should be simple in construction, cheap, easily adapted, and not too stiff, so that when applied it will yield just enough to allow sufficient gold to pass beyond the walls of the cavity for a good finish.

Dr. F. H. Guilford, of Philadelphia, Pa., in a few brief remarks, indorsed the sentiment expressed in the paper.

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THIRD DAY, WEDNESDAY, SEPTEMBER 7TH—MORNING

SESSION.

Dr. Pradere, of Lyons, France, read a paper on "phthisis cured by the continuous application of medicine to the palate."

Immediately after the paper was read, Dr. James Trueman, of Philadelphia, Pa., moved that it should *not be accepted by the Section*, but should be referred, without discussion, to Section I., in General Medicine; also embodying that the Executive Committee be censured for allowing such a paper to come before the Section. The motion was seconded by Frank Abbott, M. D., of New-York, but the Chair ruled that, inasmuch as the Executive Committee had seen fit to admit this paper, it would be out of order to put the motion to the house. Dr. Trueman dissented from the decision of the Chair and renewed his motion. The



question being then called, it was voted to refer the paper to Section I.

#### CLINIC.

A number of gentlemen gave clinics in the treatment of diseased conditions of the oral cavities, and others demonstrated their methods of filling teeth and constructing facial dentures for patients. These clinics are spoken of as the most successful features in this Section, and it is just to say that a good deal of credit is due to Dr. C. F. Boedecker, of New York, for the result.

Dr. Metnitz, of Vienna, Austria, read a paper "osteomyelitis."

The main feature of the paper was the report of cases from practice.

The history of the first case was as follows: October, 1886, a lady, aged forty-three, had two teeth extracted. A few days later she suffered with chills, which were followed by slight mental disturbances. The seventh day the patient became unconscious, in which condition she was brought to the hospital. Examination revealed there was a large swelling over the left cheek, extending to the temporal region; the skin covering this swelling was tense and pale in color; the sclerotic was highly colored (yellow,) and the skin showed yellow tinge; the pupils were without reaction. The odor of the breath gave evidence of necrosis. The submaxillary glands were very much enlarged, and the neighboring tissues infiltrated. There was unconscious urination and defecation. Death occurred the following day. The postmortem examination showed the membranes of the brain to be thickened and traversed by numerous vessels. The left hemisphere was covered by a layer of pus, and the right hemisphere showed considerable pus along the track of the vessels as well as several pus-depots. The brain-substance was quite soft. Examination of the oral cavity disclosed that of the teeth extracted the upper alveolus had almost entirely filled with healthy granulations, whereas the lower was filled

pus. The mucous membrane in the region of this diseased alveolus was very much discolored and could be easily removed in pieces. The probe discovered nothing but dead bone. All the muscles of the neck which are attached to the left side of the lower jaw were infiltrated with pus. The periosteum was separated from the left side of body and ramus of the jaw. The alveolus of the extracted wisdom-tooth communicated by two good-sized openings with the marrow-cavity, and the marrow itself was discolored and infiltrated with fat. The cause of this extensive destructive action is no doubt to be looked for in the unclean condition of the alveolus after the extraction. Sections of the jaw show that the medullary canal was very much enlarged.

Rocher, Rosenbach and Busch, in experimenting on animals, have found that it is impossible to produce an acute pus-forming osteomyelitis either through traumatic injury or chemical and mechanical irritation, but that such a condition can readily be brought about by infecting the fresh wound in the bone by any decaying substance.

The second case was one of multiple osteomyelitis. The patient, male, aged seventeen, suffered from an attack of osteomyelitis of the humerus, the ulna, and the lower jaw. According to Billroth, it is not settled whether this condition (multiple osteomyelitis) is due to septic influences acting on various places at the same time, or whether the infection dates from one point.

Death in this case, as in the first, was directly due to acute suppurative meningitis. When we have to deal with a simple inflammation, energetic antiseptic treatment will prove quite sufficient. In severer cases of osteomyelitis Billroth advises that the seat of disease be reached as soon as possible—the pus evacuated, the cavity thoroughly disinfected, and dressed with antiseptic dressing. Many cases present no actual depots of pus, or abscesses, but simply an infiltration of the marrow. In such cases Billroth holds it of little value to open into the medullary canal. Neither does he advocate disarticulation or resection, because, in the first place, the exact extent of the disease cannot be foretold, and, secondly, the medullary substance of a patient suffering from osteomyelitis

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#### THIRD DAY—AFTERNOON SESSION.

R. Andrews, of Cambridge, Mass., read a  
of the dental fibril, illustrated by aid of

Andrews described his process of preparing  
the specimens for the microscope, which differ  
essential respect from the latest methods employe  
for that purpose.

In speaking of the formation of the fibrils, the es  
there are two kinds of odontoblasts—those which  
toward the dentine, and others, just by the sides  
mentioned, which are pear-shaped. From these  
and not from the first (or square end ones), originate  
dental fibril.

The stereopticon views presented by the doctor sh  
very clearly with what patience, earnestness and intelli  
the essayist worked to establish his view of the question.  
the hearty appreciation accorded him by the Section wa  
merited.

Dr. Frank Abbott, of New York, in opening the d  
sion, paid a high tribute to the reader of the paper for the

he in behalf of his specialty. In order to understand the process by which the dental fibril is produced, it is necessary for us to consider the matter from the third to the fifth month of intra uterine life, at which period of the existence of the fetus the papilla of teeth are so far developed that a material change is observed to be taking place. The papilla is a mass of myxomatous tissue, liberally supplied with medullary elements. In some instances at three months, at others as late as the fifth of intra-uterine life, a coalescing of several of the medullary corpuscles into one may be observed upon the periphery of the papilla adjacent to the enamel organ, which at this period may be observed forming a cap upon the papilla. The united medullary corpuscles are known as odontoblasts. The impression has generally prevailed among histologists and embryologists, that the odontoblasts were directly formed into dentine. This theory, through recent researches, has been proven to be incorrect. The odontoblasts, when viewed with a power of 1,200, show a delicate reticulum, which unites the nuclei with the walls of each corpuscle and with each other. The reticulum, as well as the walls of the odontoblasts, are the living matter which remains as the living portion of the dentine. Before the beginning of the deposition of lime salts, the odontoblasts are re-converted into medullary substance. As such they receive the calcareous basis-substance, and thus a certain territory of the papilla becomes dentine. While this process of calcification is going on, another row of odontoblasts makes its appearance, from the sides and ends of which prolongations of the living matter may be seen running into the canaliculi of the dentine already formed. A spindle or pear shaped odontoblast gives off one, while those with broad ends give off two, three, and even five, prolongations. If the views advanced in the paper were correct, it would necessarily follow that territories of considerable size would be left in the dentine with no canaliculi whatever; nor is there any provision for furnishing these territories with any living tissue.

Dr. Fletcher, of Cincinnati, O., read a paper on "protective dentine; illustrated by stereopticon."

This paper was listened to with great interest by the Sec-

tion. The slides which were shown on the screen showed the different kinds of protective dentine, and the essayist gave his views of how these different efforts on the part of nature to protect herself are brought about.

Dr. W. X. Suttuth, of Philadelphia, agreed with the essayist in the practical conclusion drawn; he supplemented the reader's remarks by stating that the odontoblasts remain after the development of the dentine, but can be stimulated to produce or perform their function of forming protective dentine.

Dr. W. H. Atkinson, of New York, complimented the gentlemen on producing such well-digested papers.

Dr. J. Howard Mummery, of London, England, exhibited "photo-micrographs of all the structures of the tooth," and explained the best method of producing them.

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THURSDAY, SEPTEMBER 8TH—FOURTH DAY—MORNING  
SESSION.

MICROSCOPY.

Professor Frank Abbott, of New York, and Dr. R. F. Andrews, of Cambridge, Mass., were in charge of this department. Every facility was afforded the members of this Section to acquaint themselves with dental microscopy, both physiological and pathological. Among the ground specimens shown by Professor Abbott were those of carious teeth, congenital pathological enamel, hyperostosis (osteomas) of the roots of teeth, and deposits of secondary dentine. Dr. Andrews exhibited serial slides of the developing teeth, and the development of the dental fibril. About forty negatives from his photomicrograph were especially interesting and valuable.

CLINICS.

About thirty gentlemen gave clinics in filling teeth with gold, pivoting teeth, constructing artificial dentures, and treating (surgically) diseased conditions of the gums. It would require too much space to enumerate all the gentlemen who acquitted themselves in such a creditable manner.

C. L. Goddard, A. M., D. D. S., of San Francisco, Cal.

read a paper entitled, "pain in the temporo-maxillary joint caused by irregularity of the teeth.

Patient, thirty years old, experienced pain in temporo-maxillary joint during mastication, which was caused by straining the muscles and ligaments, owing to masticating with the jaw protruded. When the teeth were brought together, as in the act of eating, the incisors alone touched, and the bicuspid and molars were about one-eighth of an inch apart. The treatment employed consisted in spreading the upper teeth and thereby securing a proper articulation.

Dr. E. S. Chisholm, of Tuscaloosa, Ala., read a paper entitled "the influence of weather changes on the human organism."

After carefully noting the influence exerted by temperature, humidity, and electricity, the author concludes that by far the greatest power over human organism is exerted by atmosphere pressure. In support of this theory he submits two arguments. The normal atmospheric weight on man is 14.7 pounds to the square inch at the sea level. The body is sustained by an equal power of resistance, wisely provided. If the pressure be less, the surface of the body will be distended, and the superficial circulation less restrained. This change can be brought about by exposure to great altitude, as well as by natural physical causes, when the circulation will be disturbed just the same. Any undue pressure on a portion of the body may then be felt. May not this disturbance of tension on soft tissues which are fixed to the bony framework of man, or where disease has a seat in periostinal and ligamentous attachments, be liable to greater inflammation? Or when a nerve of a tooth, which in a state of health is inclosed in a bony chamber (which has no expansive liberties, nor needs them as long as health continues), becomes exposed through a small aperture; when the normal atmospheric balance is lowered, the nerve has a tendency to be drawn through the aperture and takes on inflammation, probably followed by congestion and complete devitalization.

A report from the Pennsylvania Hospital, some years ago, on the observation of barometric pressure in surgical operations, shows that in 259 operations the barometer was ascend-

... in 103, descending in 123, and standing in 34. Fifty  
 of the whole number were fatal, 11 having been operated  
 with barometer ascending, 25 when descending, and 8  
 standing.

#### AFTERNOON SESSION.

The Section was honored by a visit from the Président of the Congress, Dr. N. S. Davis. In introducing him, President J. Taft recounted the efforts that had been put forth by Davis to secure recognition to the Dental Section. To more than to any other man in the medical profession is the credit for having removed the obstruction in the way of the dental profession.

Dr. Davis replied: Twenty-two years ago I had the pleasure of entertaining the members of the American Dental Association, then assembled at Chicago, at my house. On that occasion I expressed the hope that some day, in the future, we might meet on equal grounds. My hopes of that day are realized to day. At the last meeting of the American Medical Association, when the question was brought up to admit dentists holding their degree from a recognized institution, it met with no opposition. The action of that body forever removed the obstacle which had been in your way. You are now on an equal footing with your medical brethren. He congratulated the members for the interest they took in the advancement of the healing art, and closed by warning them not to fall into 'schools,' but to meet everyone on the broad field of science.

Dr. E. S. Talbot, of Chicago, Ill., read a paper on the "etiology of irregularities of the jaws and teeth."

This paper was very exhaustive and thoroughly well compared. The writer showed throughout an intimate acquaintance with the subject, and the Section was not lacking in appreciation of his efforts.

The paper was discussed by Dr. W. C. Barrett, of Brooklyn, N. Y.

A paper by Dr. J. J. R. Patrick, Belleville, Ill., on "etiological factors in irregularities," was read by title; also one by Dr. E. H. Minneapolis, Minn., entitled "Notes on Othodontia, a New System of Regulation and Retention;" also by Dr.

Ingersoll, Keokuk, Ia., on "Inflammation of the Oral Tissues."

FRIDAY, SEPTEMBER 9TH—FIFTH DAY—MORNING SESSION.

CLINICS.

A very interesting clinic was given by Dr. A. R. Starr, of New York, in capping the exposed pulp of a tooth.

It is only of late years that any progress has been made in so treating and protecting an exposed tooth pulp so as to preserve its vitality. The operation caused the patient very little pain, and all those who have had the opportunity to see it agreed that it was a success.

Dr. William J. Younger, of San Francisco, implanted a tooth. Great diversity of opinion was expressed as to the ultimate result of this method of thus supplying the lost teeth.

Dr. R. B. Adair, of Gainesville, Ga., completed the treatment of a case of pyorrhœa alveolaris.

Thirty-two other gentlemen gave clinics on filling teeth and constructing artificial dentures.

Prof. F. Busch, of Berlin, Germany, read a paper on "the comparative pathology of the teeth, with special reference to the tusk of the elephant."

A number of specimens were shown by the doctor to illustrate his paper. At the close of his paper the doctor exhibited an instrument for removing the small birth-marks so often found on the face. The instrument have a circular cutting edge ranging in size from one-fourth to half an inch in diameter, and fit into the dental engine. The mode of operation consists in selecting a knife the size of the mark to be removed, and placing it upon it, quickly revolving it. It will take only a moment to accomplish this, and is said to be almost painless. The only dressing the doctor applies is dry cotton, which he leaves in position for from six to eight days, at the end of which time the part is perfectly healed.

Discussion of the paper was taken part in by Drs. Wm. H. Atkinson, of New York, and W. C. Barrett, of Buffalo, N. Y.

Dr. E. Andrieu, Paris, France, read a paper on "the sixth year molar."

The essayist held that the sixth year molar being in



development, eruption, and structure an organ of transmission from the temporary to the permanent set, it should be extracted when the permanent teeth are in position. More is gained by this procedure, and a longer period of usefulness insured to those remaining,

Dr. L. D. Sheperd, of Boston, Mass. The doctor expressed his regret that such sentiments should still be prevailing among the profession. He cited cases from practice, the extraction of these teeth caused not alone loss of valuable masticating surface, but actual irregularity of the remaining.

Dr. Paul Dubois, of Paris, France, stated that he was in the Section to note that the ideas expressed in the paper were not carried out by the dentists in France.

Professor Frank Abbott, of New York, could see no difference in structure between the sixth-year molar and the permanent teeth under the microscope, but a very marked difference was apparent between that and the temporary.

A paper by Dr. Th. David, of Paris, France, on "Chronic Stomatitis," was read by title.

Dr. J. S. Marshall, of Chicago, Ill., read a paper on "Operation for the cure of a persistent neuralgia of both temporary maxillary articulations, and reflected pain in the right brachial plexus.

History.—Patient, female, forty-two years of age, operated on some eight years before for the removal of an osteo-sarcoma of the right inferior maxilla. Extensive suppuration followed, and the wound did not heal for several months. Considerable cicatricial tissue was formed, and the jaw displaced to a considerable extent. Neuralgia dated from the healing of the wound, and the conclusion arrived at that the irregular position of the jaw was the cause. An operation for the relief of this condition was performed, and the neuralgia ceased. The doctor described the steps of the operation at great length, but failed to show that it differed from methods generally employed.

The following papers were read by title: "Articulation of Artificial Teeth," by Dr. H. L. Cruttenden, of North Minneapolis; "Power in Dentistry," by W. St. George Elliot, M.

of London, England; "Porcelain Filling," by Dr. E. C. Moore, of Detroit, Mich.

Dr. Alton H. Thompson, of Topeka, Kan., read a paper entitled "does function control the evolution of structure?"

Some time since, Dr. C. N. Pierce discussed a subject similar to that at the head of this paper. After noticing the mechanical forces involved in and influencing the evolution of the teeth, he says: "Those cumulative forces are utilized through heredity, and while so potent in tooth-evolution, exert a similar influence in the development and modification of all other structures and organs. All departments of biology recognize the fact that heredity, adaptation, and growth, being of special importance in the evolution of the organic body, must therefore be regarded as especially formative functions. Adaptation to environment might be called the ancestor of function, as function is of organization. Illustrations of modifications of structure in response to function are very numerous in which it is shown how an organ may be completely changed or a mere rudiment be fully developed by the demand for the performance of a function unknown before."

A century ago Lamarck laid down the following laws concerning the development of organic life, which we, with all our accumulated facts, can change but little. In his second law he said that the production of a new organ in an animal body results from the supervention of a new want continuing to make itself felt, and a new movement which this want gives birth to and encourages. Third law: The development of organs and their force of action are constantly in ratio to the employment of those organs. Fourth law: All that has been acquired, laid down, or changed in the organization of the individual, in the course of this life, is commenced by generation and transmitted to new individuals which proceed from those which have undergone those changes." Altered wants lead to altered habits which result in the formation of new organs, as well as in modification and growth of those previously existing.

In our study of the subject, we will confine our observations to that field in which we, as dental and oral specialists, are most interested the teeth.

Everything is made for a purpose, and the purpose must

precede the thing made for effecting the purpose. Nature plans her work as deliberately as man plans his actions. The means for accomplishing an end are not the cause of execution but the effect. The organ is the effect, and function is the cause of structure. As food-selection is the cause of function, so the function of the acquisition and preparation of food is thus the cause of the masticating apparatus.

If function is the cause and support of structures, the organ develops or atrophies as it is used or disused, the impulse of active employment dictates the evolution of organs and tissues in succeeding generations, if organs have been suppressed through disuse or remain in various forms as rudiments—their function having passed away—then, in the future, must the teeth of man be tending toward final and inevitable suppression.

If in the future of physical education there shall be a place for education in the accomplishment of mastication of food, then, indeed, may the teeth be improved and developed by exercise, as the muscles and lungs are improved and developed.

Owing to the time for adjournment having arrived, no further discussion was had on this paper.

The President congratulated the members on the interest they had shown throughout the session, and hoped great results might come from this Congress, both to the profession and to their patients.

A vote of thanks was voted to President L. S. Day for the exertion he put forth in behalf of the dental section.

Also a vote of thanks was offered to President J. T. Smith of the Executive Committee.

[From advance slips supplied by *The Medical Record*, of New York from its special report.]

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## ARTICLE II.

### BRITISH DENTAL ASSOCIATION.

The annual general meeting of the British Dental Association was held in the Hall of the Faculty of Physicians

and Surgeons, Glasgow, on the 18th, 19th and 20th ult. Sir Edwin Saunders, F. R. C. S., President, occupied the chair, and there was an attendance of about 120 members.

The President, in opening the meeting for Association business, announced the resignation of Sir John Tomes from the office of President of the Representative Board of the Association. He was afraid they must accept this resignation as final. Sir John had been induced last year to withdraw his resignation for a year, but his inability to attend the meetings had, as he explained, rendered him unable to hold out a prospect of any longer being President. But, at the same time, he was quite ready on all occasions to give the Association his valuable advice, which they would esteem in all cases of difficulty, because no man, perhaps, was better able to advise when any questions of difficulty arose, from his long observation and experience of everything connected with the institution, and from the singleness of purpose with which he had, at all times, devoted himself to the interests of the Association.

The letter of resignation and a valedictory address by Sir John Tomes to the Representative Board having been read, the President moved, and it was resolved—"That this meeting accept with great reluctance the resignation of Sir John Tomes as President of the Representative Board of the British Dental Association, and desires to record its deep sense of the value of his services in the cause of dental reform and professional organization, and especially of his vigilance during a long period of impending legislation in medical matters which has resulted in securing a full recognition and place for dental surgery in the recent and probably final Medical Amendment Act of 1886."

It was afterwards agreed that the vacancy caused by the retirement of Sir John Tomes should be filled up by the appointment of Mr. Smith Turner, who has hitherto acted as Vice-president of the Representative Board; and Mr. Felix Weiss was appointed Vice-president in room of Mr. Smith Turner.

Mr. F. Canton, Treasurer *pro tem.*, reported that the balance in bank at the credit of the Association was £5 16s. 2d.

Mr. Morton Smale, Secretary, stated that the total number on the roll of the Association was 645, being an increase of 38 over last year.

It was agreed that the next meeting should be held in Dublin on the 23rd, 24th and 25th August, 1888.

Mr. Daniel Corbett, Dublin, President of the Irish Branch, was elected President-elect; and Mr. F. Canton was appointed Treasurer in room of Mr. James Parkinson, who had been obliged to resign on account of ill-health.

Sir Edwin Saunders, in his valedictory address, said that the question of greatest moment to them was what had been the effect of the past year's operations of the Association; what was the record of its work, and to what extent had it fulfilled its purpose? Had it satisfied or fallen short of the expectations of the profession in whose interest it was established? He could not help thinking that the reports to which they had listened gave a very satisfactory answer to these questions. This phenomenal year, which had witnessed an unparalleled outburst of patriotism and loyalty, this jubilee year, when they were alternately filled with amazement at the fervour of attachment of all classes and conditions to the personality of our Sovereign, and with the benignity of nature in the unwonted affluence of sunshine with which our beloved fatherland had been favoured—would be remembered by the members of the Association as having been signalized by the formation of the Irish branch. This gratifying event, the consummation of which was greatly due to the prompt action of Mr. Smith Turner, Vice-chairman of the Representative Board, whose energy and unselfish devotion to duty had been displayed on many similar occasions, would, he felt sure, be regarded as a matter of sincere congratulation by the Association, at once as an undoubted accession of strength not only by the augmented number of members, but by the social position

of the gentleman by whom their profession had been so well represented in the sister isle. For them he hoped the affiliation would be productive of freer intercourse, warmer friendships, more liberal judgments of each other, greater dignity and prestige, with a higher estimation of the profession on the part of the general and medical public, and all the social gifts and privileges which spring from united action for the common good.

The two great engines for raising the dental profession were an educated public opinion and organized instruction in dental science; and these were working steadily and surely for this end. If they looked back only some twenty years they could not fail to be struck with the real and substantial advance which had been made not only in the development and resources of the art, but in the social and educational status of those now entering its ranks. And it was in this direction that would be found the true and efficient means of at once freeing it from opprobrium and purging it from the contamination of the unworthy.

On the motion of Dr. John Smith, Edinburgh, seconded by Mr. Charles S. Tomes, London, the retiring President was awarded a vote of thanks for his services during the year.

Mr. J. R. Brownlie, President, then took the chair. In his opening address he said it was his pleasing duty to welcome the British Dental Association to Glasgow—to a city having associated with it memories which they must all be disposed to cherish, and memories, too, which, save for the lessons they taught, they could now afford to forget. He would remind them that they were now on what should be classic ground, in a neighbourhood possessing a special interest from having been the scene of the first essay in life of the man who had been fitly described as the father of the dental profession. In the near neighbourhood John Hunter was born, and in Glasgow he worked as a tradesman during his earlier years, before devoting himself to more congenial work, and in which he so distinguished himself. It was

pleasant, he continued, to note the interest taken in the the youngest relative, by the medical profession, as they saw it in the action of its representative institutions. Ancient seats of learning were interested in their progress and medical schools were competing for the privilege of educating their youth.

The license in dental surgery was growing in number and in public appreciation. He knew not if it was the company Parliament decreed they should keep which had stimulated so many to take advantage of the *sine curricula* provisions, but he knew that in this neighbourhood the possession of the license in dental surgery was increasing from one within ten years anterior to the passing of the Act to 50 per cent. within ten years thereafter.

Amongst the more important results of legislation they must give a very prominent place to the British Dental Association. Formed to give effect to the spirit and the provisions of the Dentists' Act, it was yearly drawing closer professional ties. It was bringing together those who might not otherwise have met, and under conditions which could not fail to promote the art and the interests of the dentist. But it would be to misrepresent the situation to make it appear that they had as yet great occasion for rest and be thankful. A first attempt at legislation would necessarily leave room for improvement. Already certain alterations had been effected with advantage, and it might be expected that from time to time opportunities would present themselves for further adjustment of the provisions of the Act.

Of medical titles at home and dental titles abroad there was no lack, and so long as they were legitimately acquired and used the additional information and experience they represented must prove a gain to their possessor and to the credit of the profession of which he was a member. If the medallion had its obverse. The most coveted distinctions had been imitated. They had not now to compete so much of absolutely base metal as of the extent to which

was alloyed. Surely two out of so many (25) dental diplomas granted in America was too small a proportion to be found deserving a place on their dental register. Probably they ought now to congratulate themselves that the issue of really counterfeit diplomas was at an end. In respect some improvement had been effected. It was over a dozen years since they had in Glasgow an agency for the sale of bogus diplomas—since he was favoured with a visit by the accredited agent of one of these so-called American colleges, having full authority to examine *in person*, and to grant any or as many titles as might be desired. This man's agency extended to granting a degree in doctor in divinity, medicine, dentistry, and some others, and the charge was moderate, considering the outlay usually entailed in the acquisition of such honours. So that an abuse could not long survive. This "college" was suppressed, and it did not appear that such honours were now to be had on the like easy terms.

They had, however, something still to hope for at the hands of their Transatlantic brethren. They were still left to contend with the varying value of American dental diplomas, nor could they be content that the title conferred could acquire by contraction a fictitious value, that it could have one meaning in America and a different meaning here.

In conclusion, he said their Association had assumed the most comprehensive title, and it had yet to make good its claim to it. The name included as a legitimate field of the Association's operations the whole of an empire on which the sun never sets. Were they to understand the term British as employed in its limited or its widest sense? His answer to that was that their sphere of action had been limited, and they might still increase within this limited sphere. But this could not be accomplished until they had taken possession of the wider area; and not till the Association was represented by branches wherever dentists were in numbers sufficient to combine for the purpose could they



claim to be, in the fullest acceptance of the term, the "British Dental Association."

The reading of papers was next proceeded with, the first being on

#### THE HASTIE WATER MOTOR,

or the water pressure to be obtained in all towns in Great Britain and Ireland of above 10,000 inhabitants, with remarks in reference to the use of the Hastie motor in workrooms and surgeries, by W. Campbell, L. D. S. Eng. Dundee. This was read by the Secretary, Mr. Smale. In the course of the paper, Mr. Campbell gave his experience in working the Hastie motor in his surgery. The machine has proved very serviceable, but was still capable of improvement. When a sufficiently perfect machine was obtained, motors, whether Hastie's or some other inventor's would, he believed, be used by all dental surgeons, and would be found in all dental work-rooms. For the proper working of the machine it was necessary to have a continuous and sufficient pressure of water. The paper closed with a list of the various water pressures to be obtained in the chief cities and towns in the United Kingdom.

#### CONTINUOUS GUM WORK WITH ANY FORM AND MAKE OF TOOTH,

by James Cumming, L. D. S. Glasgow. Although they had made great strides of late in both surgical and mechanical dentistry, there seemed to be yet room for improvement. It was to what he thought was an improvement in a process in the latter branch of their profession that he would call their attention. Most of them had seen, and some had tried, the Verrier process of producing continuous gum facings. Probably all would admit that there was considerable difficulty and uncertainty in producing a satisfactory piece of work of this kind by the present process. First of all, a particular kind of tooth must be used; secondly, when the work was finished, there was considerable warpage, sometimes entirely spoiling articulation; thirdly, the

th get fused and made unsightly on the surface from being exposed to the great heat required to fuse the gumming; and, fourthly, there was the tendency of the facing crack, even when the piece was being worn in the mouth, and without any apparent cause. The improvements he had been working out would certainly do away with the first three defects mentioned, and, to a great extent, if not entirely, with the fourth. In his process, which he explained at some length, the advantages were that a broken tooth could be replaced easily, and any form of tooth could be used. When all this could be done without the use of pure gold as a solder, and the teeth wholly untouched by the fire, they would surely agree with him that it should be the coming process of continuous gum facing.

Specimens of the work were passed round for inspection, and an interesting discussion followed.

Mr. Gordon Jones, L. D. S. I., London, next read a paper on

#### A MORE EFFICIENT METHOD OF CONFERRING DENTAL APPOINTMENTS.

He protested against the general rule in provincial towns of conferring dental appointments in connection with institutions on gentlemen having either the most influence or largest practice, thus asking them to perform duties which they had not the time to discharge conscientiously.

#### THE MECHANICAL TRAINING OF DENTAL STUDENTS.

George Cunningham, B. A., D. M. D., L. D. S. Eng., Cambridge, read a paper on the above.

There might perhaps exist, he said, certain laboratories where complete and efficient mechanical training might be obtained, but he feared they were few and far between. If they put aside all questions of self-interest which they might have as instructors, they must admit that the present system of pupilage had its drawbacks as well as its advantages. His main proposal was that the whole of the time

of the dental pupil should not be exclusively passed in the dental laboratory, but that, where suitable institutions existed, a tangible part of each day, or even alternate days should be spent in attendance at some practical and allied courses of manual technology or in a practical school of mechanics.

The conditions and the actual courses followed must vary according to the various opportunities afforded in the different parts of the kingdom. Mr. Morton Smale, H. said, held that a practical examination in the mechanical department should form a part of the ordeal to be passed before the student obtained his coveted diploma. He trusted the Association would cordially support such a proposition, as thereby it would be the sooner carried into force. That proposition, however, seemed to him only another very strong reason why the dental student should be furnished with an opportunity of remedying the possible defects and deficiencies of his private pupilage by the optional and public course of one year in a practical technical school. Some such arrangement as he had just indicated would combine the advantages of the school system with that of the present form of pupilage, and certainly would do much to promote the efficiency of the L. D. S. diploma, which, after all, must ever be the essential qualification for a thorough dental practitioner.

A long discussion followed the reading of the paper in which Messrs. Smale, Pearsol, Gaddes, Smith, Woodburn, Wilson, Fothergill, Turner, Brunton and Stack took part.

In the evening the President and Mrs. Brownlie held a reception of the members of the Association and their friends in St. Andrew's Hall, music and dancing adding to the enjoyment of the company.

FRIDAY, AUGUST 19th.

The business of the second day began by a meeting of the Benevolent Fund, the President, Mr. J. R. Brownlie in the chair.

Sir Edwin Saunders, F. R. C. S., submitted the treasurer's report, which showed that the income during the past year amounted to £369 6s. 4d. Of this sum £81 4s. 4d. was received from donations and £288 1s. from subscriptions, which, with £152 8s. 11d. in bank at the commencement of the year, made a grand total of £521 15s. 1d. There was expended during the year in benevolent allowances £180 11s. 10d., being £31 more than last year. At the present time the money in bank amounted to £210 4s. 4d., and on hand £24 15s. 1d. The income was £91 4s. 5d. greater than the previous year. The invested capital now reached £863 5s., and last year it yielded an income of £20 4s. It must be most satisfactory to the subscribers to the fund to learn that the working expenditure for the year amounted to only £5 5s.

Mr. S. J. Hutchinson read the Secretary's report. It stated that the general business brought before the Committee during the year had been on the increase compared with past years. The number of children who were being educated at the expense of the fund was eleven.

#### THE VALUE OF ANTISEPTICS IN DENTAL SURGERY,

by E. Lloyd Williams, M. R. C. S., L. R. C. P., L. S. A.,  
D. S., Eng., London.

He made no apology for introducing this subject before the Association, because he was convinced of its importance, not only in its purely scientific aspects, but more particularly in its practical bearing upon the every-day work of modern dentistry; and to the latter consideration he intended addressing himself exclusively. It would be his endeavour to touch upon the broad principles which should rule over their practice, and to suggest a few special points of treatment which had been found valuable, rather than to formulate any hard and fast laws or dogmatise upon pet theories and particular methods.

The debt of modern surgery to Sir Joseph Lister was difficult to gauge; but they were apt to lose sight of the fact that they owed less to what was known as strict

"Listerism" than to the great doctrine of cleanliness which underlay all the teaching of that eminent surgeon. The great principle which regulated all operations and which had been the very foundation of success was absolute surgical cleanliness. He feared that, as dental surgeons, they had even yet scarcely grasped the importance of this principle.

It was true that their sphere of surgical work was limited, and that they were concerned for the most part with hard tissues, which they looked upon as being comparatively indifferent to external conditions; but they must not forget that even in the simplest operation they had to do with living material, not to speak of those branches of their work where they were brought face to face with ordinary surgical conditions, and when the result of the treatment was wrapped up with the constitutional welfare or woe of their patients. Nature stood more insults in the mouth than in any other part of the body, and her long suffering had admitted of much reckless treatment with comparative impunity. There was probably no operation on any part of the human body commensurate with that wrenching a tooth from its bony socket where the repair was so rapid and the after effects so slight. If this were not so they should probably approach the mouth with far greater degree of caution, and should employ every possible antiseptic precaution for procuring a minimum local and constitutional disturbance. But it yet remained to be proved how far they could improve upon present results by being more cautious, and he felt confident that in special cases antisepticism must lead to more brilliant results if carried out with thoroughness.

There was another side to the question which must not be lost sight of. It was well for them that there were so few recorded cases of inoculation from the mouth, but that was no reason why they should employ dirty instruments. Cleanliness, then, should be an elementary but essential principle of their practice. All their instrumen



ould be not only clean, but, where at all probable to come contact with the soft tissues, absolutely aseptic.

There were other ways in which antiseptics might be useful in dental work. The commonest operation which they had to perform was the preparation of cavities for the insertion of fillings, and there was always a septic condition of the tissue to be contended with. In difficult cavities these disinfectants must be of value. Speaking of the power of absolute dryness to protect susceptible bodies from putrefaction, he said he believed the use of the hot-air syringe was one of the operative reforms which was most to be desired. The air itself could be rendered aseptic by dropping into the rubber bulb of the syringe a few drops of eugenol or eucalyptus oil. As a further precaution, any unsound dentine left in the immediate neighbourhood of the pulp, having been thoroughly dried, could be painted with an antiseptic varnish and then promptly dried with a current of warm air. Mr. Williams concluded with a reference to the filling of dead teeth and the advisability of rendering even temporary fillings antiseptic.

Mr. A. Kirby, L. D. S., Eng., Bedford, read an interesting paper on

#### THE APPLICATION OF ELECTRICITY TO DENTAL USES.

#### THE DENTAL ASPECT OF PUBLIC HEALTH,

by George Cunningham, B. A., D. M. D., L. D. S. Eng., Cambridge.

The efficient treatment of so great a question must no longer be left in the hands of a few, no matter how energetic they might be, and his object was to suggest some plan of campaign" which, after due discussion and approval, would receive the weight and influence with which the corporate and united action of their Association could imbue it. Every one recognised the fact that the diseases with which the dental practitioner dealt did not directly contribute to the death-rate, and that they were neither

infectious nor contagious. Hence, doubtless, arose the utter indifference of the community with regard to it, nor would that indifference be removed until the compulsory and indirect influence which they had on the community rate was better understood.

The fact of State medicine being possible marked an epoch in which some sanitary rules received a general assent, and indicated an advancing civilisation. Was it much to demand that State medicine should include dentistry? He thought not. It was both the duty and the interest of the State to protect the helpless child from the results of dental as well as other disease, whether arising from the ignorance, the neglect, or the incapacity of the parents to provide the necessary treatment. In the consideration the very important fact should be recognized that from a lack of attention in the period of their youth men and women of the future were allowed to grow up with the inevitable certainty of future suffering, a large proportion of whom could only be radically treated between the ages of from ten to fifteen years. This naturally brought them to the consideration of Mr. Fisher's attention for the compulsory attention to the teeth of school children; and no intelligent reader, whether professional or otherwise, could but admit that he had succeeded in proving his case. Some would be inclined, perhaps, to scold the proposition of compulsory attention as visionary and Utopian, while others, admitting the advantages of such a scheme, might think they disposed of the question by stamping it as rank socialism. Again, many half-sympathizers with this great project were at once thrown aback by the economic difficulties of its institution. It is no use disguising the fact that this was a most serious aspect of the question. Every one would be quick to recognize the increased charge upon expenditure, but comparatively few had the power that they possessed of realizing that it would be rather a mere transfer of liability already incurred in some other way, if not absolute saving.

expenditure in other directions. The question might need be postponed for a time but a sense of patriotism would urge them on to be the leaders rather than followers of a movement which time itself would hurry on.

Without referring to the action which some of the American dental societies had taken in promoting attention to the teeth of school children—in France, where no power-association such as theirs existed, measures had been taken for the inspection and care of the teeth of children in the schools of Paris—he would ask them for a minute to consider how this important matter affected the services. There could be no doubt whatever that the Army Medical Department recognized the advisability and the necessity of remedial treatment other than that by mere extraction. If this were not the case, no provision would have been made for the supply of tooth-stopping and scaling instruments. The nature of the provision, however, was so absurd, that they were doing a service alike to the soldier, the army surgeon, and to the already heavily-burdened taxpayer in calling attention to the fact. Who until the other day ever supposed that gold foil was provided for the filling of the soldiers' teeth; but did any army man ever know of the gold foil reaching the mouth of Tommy Atkins? In these days of Government inquiry, it might be uninteresting to find out something about this misapplication of the nation's funds, for as experts they recognized the utter impossibility of properly manipulating not only the gold foil, but the amalgam and gutta-percha also provided, with the absurd equipment of three scalers and forceps, and three excavators and roseheads!

Nor was that all. Not only were the materials provided absurd, and the equipment utterly inadequate, but the army dental stations only provided for one such case being kept at the headquarters of each military district. The least intelligent inhabitant of Glasgow would see the absurdity of the provision when he knew that the whole of Scotland contained but one military district. But even were the



materials, the instruments, and the distribution of the equipment all that they could desire, what was the use of it if the army surgeon had had no training in necessary manipulative skill. He could not help feeling that, the attention of the department had been called to this important question, they should recognize and put in force the power they undoubtedly possessed of requiring all army medical candidates to produce evidence of having received at least an elementary training in dental surgery. He concluded by submitting the following resolution:

"That this meeting is of opinion (1) that wherever the State provides medical services dental services should be provided for as an essential part of such medical provision."

"(2) That, having regard to the great importance of securing competent attention to the teeth of the army and navy, the Representative Board should consider the advisability of urging the Government to make suitable provisions to that end;

"And (3) that, considering the compulsory attention to the teeth of school children would be a national gain, the Representative Board should be empowered to further the matter in any way they deem most fit."

The resolution was adopted.

During the afternoon a number of demonstrations were given at the Dental Hospital, George Square.

Mr. Kirby exhibited an electric mallet and engine. The apparatus was supplied with current from a set of secondary batteries manufactured and charged by Messrs. Muir, Mavor and Coulson, electric light engineers, Glasgow. These cells require almost no attention further than recharging when run down.

The Hastie motor was shown in work.

Mr. Gordon Jones described a method of treating alveolar abscess.

Mr. Howarth showed the working of his articulator.

Mr. E. Lloyd Williams filled a cavity in a lower molar.

Mr. Coxon exhibited a series of regulation cases, and also a means of shutting off the gas of the Vulcanizer.

Messrs. Ash & Son and the Dental Manufacturing Co. had each a display of instruments and apparatus.

In the evening the annual dinner of the Association was held in the Grand Hotel, Charing Cross. Mr. J. R. Brownlie, President, occupied the chair, and Mr. J. S. Woodburn and Mr. Rees Price acted as croupiers.

The Lord Provost of Glasgow, the President of the Faculty of Physicians and Surgeons, and other distinguished visitors were present, and there was also a large attendance of the members of the Association.

Saturday, the 20th, was devoted to pleasure. A large company visited the shipbuilding yard of Messrs. Denny, at Dumbarton, where, before leaving, a most hospitable repast was provided by the firm. After viewing the works the members of the Association and their friends were entertained by the Scottish Branch. A sail by steamer down the Clyde to the head of Loch Long and back, with a good luncheon on board, terminated another successful meeting of this representative Association.—*London Dental Record*.

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### ARTICLE III.

## DENTAL ETHICS.

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BY T. H. LIPSCOMB.

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In discussing this question, so important not only to us as dentists, but to the world at large as our patients, let us first endeavor to understand clearly the meaning embraced in this term. Ethics is defined to be a code of laws for the government of a body in their conduct toward each other as a body, and toward others with whom they are thrown in contact. Since men in the earliest times

began to associate together there has been found the necessity of a code of laws to regulate and control them. There were at first very few and simple, being only what was generally conceded to be the common rights. But later, as the population of the world increased and men began to form themselves into kingdoms and nations, then a code of written laws came into vogue, and penalties were provided for their violation. Still later on, when men began to find other means of gaining a subsistence than by tilling the soil, and found a necessity for skilled labor, then they divided themselves into trades and professions, and were sub-divided into specialties, the need of a code of ethics to regulate the practitioners of each profession and their conduct toward each other and toward their patients was found necessary. This was especially so in the practice of medicine, and dentistry being but a branch of the profession, must feel a like need.

The American Dental Association formulated a code of ethics which is, or should be familiar to each of you, and fits to a great extent the requirements of the profession, and has since been adopted by all of our associations for the States and governments. It therefore remains with you to enforce this code, as formulated by the American Dental Association and adopted by you, and which you have pledged yourself to support.

You are all aware of the fact that to-day there is a greater necessity for the enforcement of these laws than in almost any State in this Union. Why? Because Texas to-day stands almost alone and solitary as one State that has refused to protect her people from the quack and charlatans who being debarred by law from practicing in their native places, come to Texas, pay their occupation tax, swinging their shingles to the breeze of heaven and announce themselves as dental surgeons, and guarantee all their work as first-class. The State of Texas refuses to protect her people from imposters by the enactment of laws forbidding any to practice dentistry who are not graduates of

able dental college, or who pass a creditable examination before a board of examiners appointed either by the state or by this Association. This examination should be such a one as any first-class college would demand of its students before conferring on them its diplomas. In the meanwhile, we, members of this Association, should endeavor to protect our people by raising the standard of our Association so high that all will endeavor to enroll themselves under our banner, and let being a member of the "Texas Dental Association" be a recommendation strong enough to satisfy the most skeptical. The higher we raise the standard of our Association the higher it will be appreciated, both by the profession and by the people. A dentist desiring membership in this society should be compelled to undergo such an examination as you may see fit to demand, but it should at least be as rigid as any college demands of her graduates. The aim of our profession should be to raise itself everywhere. Our colleges are working with that end in view, and we should support them in their efforts. Some of them have done away with the three-years clause, and compel their students all to attend three years regardless of previous experience. This will have its effect in time of elevating the standard, and they will have a better theoretical knowledge of their profession, and practical will come in time. Men now in the profession should refuse to take young men as students unless they will pledge themselves to attend college. Perhaps you may criticise my dwelling on higher education, but it is the educated man who takes pride in his profession and strives to raise it by every method in his power, while it is the uneducated dentist who, as a rule, does not feel that he should, or observe the ethics of the profession. It is usually the lower class of men who resort to printer's ink to draw patients to their office by glaring advertisements. On this subject I will quote from an address by Dr. Geo. J. Friedlander, before the Louisiana Dental Society:

"Notwithstanding our dental colleges are daily send-

ing forth many worthy and thoroughly competent men, the deplorable fact stares us in the face that a great number of young men enter the profession not properly qualified, and in the great majority of cases the dentists themselves are to blame. To illustrate: a boy is hired to attend the dental bell; in his leisure time he assists in the laboratory; eventually he learns to extract teeth; self-conceit steps in, and with swelling pride he concludes that he knows more than his preceptor; or the case may be that he is thrown into contact with some ignoramus practicing dentistry, and feels his superiority. In either case he hangs out his shingle a full-fledged dental surgeon, though perhaps never having seen the inside of a dental college, or ever read a single treatise pertaining to the practice of dentistry. This is the class which generally produces the advertising dentist, though it must be confessed with shame and sorrow that there are some who have drunk at the fount of knowledge so lost to every honorable impulse, so debased in principles, as to disgrace their alma mater and prostitute the profession for lucre's sake. Advertising dentists! 'By the fruits ye shall know them.' An advertising dentist is not a modest man, for he does not 'hide his light under a bushel;' he is not a contented man, for he publishes to the world that a generous public has not awarded him his due share of employment; he is not an upright man, for he disregards the edicts of his profession in not obeying its code of ethics; he is an unprincipled man, for he tries to raise his own status by belittling the standing of his fellow practitioners; he is an arrogant man, 'for he knows it all.' Pity the man who in his arrogance places himself above being taught. He is a conceited man, for he judges others by his own standard; he is a selfish man, for his whole soul is wrapped up in self, and to him the almighty dollar attracts every spark of honorable merit; and lastly, he is a dishonest man, for he promises results which he knows cannot be attained, thereby obtaining money under false pretenses."

The clause in our code in regard to advertising is very plain and definite, and any infringement on it should be promptly noticed by you. A simple card, announcing name, business and address being all that is allowed. This does not cover putting name, business and address in box-car letters on a twenty foot board, on the fences of our public roads, as some of our professional brothers seem to think.

In regard to the treatment of our dentist toward another, we can only be careful to observe the courtesy which is practiced by gentlemen in polite society. Do not do or say anything in disparagement of a brother dentist; do not criticise his work in presence of his patients. If you cannot say anything in his favor, remember that "silence is golden." Words said intending to reflect on a fellow practitioner will often injure the speaker more than him at whom it was aimed. How often, though, do we see professional envy and bitter feelings crop out, and dentists say things of each other behind their backs which would not be tolerated if said in their presence. Our code says that the young man should show special respect to the old, and the old man should encourage the young; but how often is the reverse of this the case. Our young men, fresh from the walls of their alma mater, will sneer at their elders call them "old fogies," "old moss-backs," etc. Nor are the older men much better. Instead of their taking the young man by the hand, encouraging him and helping him over the hard places, enabling him to get fairly started in his course, they will sneer at their younger rival, dubbing him as a "greenhorn," or as "a brainless school-boy."

In speaking of our conduct in our intercourse with our patients, I cannot do better than quote from an address by Dr. Freeman of the Vanderbilt Dental College, to the class of 1882. He says: "However lofty your attainments may become in your profession, it will still be absolutely essential that you should be a gentleman in the highest sense of the word. Society will have no ornament how-



ever sacred, that will not be committed to your keep. The delicate and refined treasures of this life must be kept beneath your shadow and pass under touch of your hand. The physician deals with the sick, but the healthful are trusted to your confidence. If you bear with you into the riper years of life this sacred trust of confiding society will grant you a place among the highest of the high, crown you with the brightest chaplet to be worn in declining years; but if you, for want of manly principles and care, fail in this important career which you have voluntarily chosen, your name will justly be enshrouded with gloom and your last retreat will be found among earth's most unworthy. Gentlemen, you must be intelligent, as well as chaste and elegant in deportment, for the best representatives of mental culture are those who will most frequently visit your office. The uncultivated and uncivil will apply for relief from pain, but their stay will be short and their visits infrequent; but the affluent and the gifted will seek your chair, and feel disappointed, and go away to return no more if you prove an unworthy peer. The treatment of the most skilled hand is often declined because it is preceeded by an uncultivated tongue, together with forbidding surroundings. Neglect will oftentimes produce misfortune which are called upon to remedy. These you must see and not seem to see. Your patience and gentleness must open a bridge for the timid the chasm of imagination or well grounded fear. Firmness and kindness, encouragement and truthfulness, are connected with each other, and must constantly attend your chair. Courage and sympathy are manly traits, and are the faithful dentist's strongholds. Make your office genial and attractive. Cultivate promptness of comprehension so as to read your patient rapidly and without any delay advance with your purposes.—*The Dental Journal*.

## ARTICLE IV.

## THE ABUSE OF DENTAL CHARITY.

Under the above caption the *Dental Review* publishes every outspoken editorial, taking to task the dental colleges for abusing their opportunities by encouraging patronage from the wealthy or well-to-do classes. An outline of the writer's statements and criticisms includes the following as: The dental colleges advertise the rendering of services free, or at a merely nominal cost, placing no restrictions upon any who may choose to avail themselves of the privileges; the colleges in the large cities are, without exception, run as money-making institutions; their advertisements that fillings will be made at cost of material are untrue, their object being to entrap the unwary. From 300 to 500 per cent. over and above the cost of material is invariably charged, and very often a handsome fee is exacted and paid. Handsomely-dressed ladies in sealskin gloves are among the frequenters of the operating rooms, etc.

From these considerations (and other not quoted above), the writer concludes that the evil referred to urgently requires attention on the part of the various dental college faculties. He says: Private practice in Philadelphia has already been made to suffer seriously at the hands of the dental colleges, and the same evil threatens disaster to individual practitioners in other cities where colleges are located." The remedy suggested is to furnish "charity certificates" to public officials, physicians, dentists, clergymen, business men, and others who are willing and able to contribute for the patient's inability to pay a reasonable fee.

This is the first time we remember to have seen in print so unreserved an expression of opinion on this matter. The subject has been privately discussed among city dentists, to our knowledge. The statement that private practice has suffered seriously at the hands of any dental



college would seem to require confirmation. Personally we have never heard any particular dentist complain that his patrons have abandoned him in favor of the dental college. The fact that well-dressed persons have been seen among the patients at the dental college does not argue that some dentist has been robbed of a patron. By no means. As in many other matters, the question as regards dental services is, with certain penurious people, whether they shall get such services for a trifle or go without them. A good many dentists are so peculiarly constituted that they conceive a strong dislike for people who haggle about fees, so that their chief desire is to be well rid of them as quickly as possible. To cut the matter short, they perhaps recommend the dental college. No very extended inquiry would be needed to show that reputable practitioners occasionally send a poor but respectable-appearing applicant to the dental college, rather than leave him to drift into the hands of the cheap charlatan. The profession might perhaps do much to assist beginners in practice by sending poor but worthy applicants to them. But, as a matter of fact, most of the beginners want to be pretty well paid, too. Moreover it should be remembered that the strictly pauper class can hardly be attracted in sufficient numbers to afford constant employment for a large class of dental students. They do not appreciate operative dentistry sufficiently to submit to the pain and tedium of operations, even when offered gratuitously. What is equally to the point, students are apt to be somewhat fastidious. A comely waiter-girl or a coy young chambermaid is regarded with more favor than a pock-marked pauper. The students select "material" to suit their individual tastes from among acquaintances picked up during their winter's stay in boarding-houses. We use to do it ourselves.

If, then, we take the classes a grade or two above the paupers, we must incur the risk of respectable clothing, and perhaps submit to the occasional intrusion of a sealskin sacque. We have had occasion to notice that the sealskin

sacques are sometimes cheap imitations worn by "ladies," as the appellation is used, but ladies whose charms of person and character are more gracefully exhibited in the kitchen than in the parlor.

Take it all in all, we doubt whether the dental colleges can be shown to be working detriment to the interests of any reputable practitioner. They may injure the quacks. The private practitioner is protected, in the nature of things, by several considerations. Pride deters many, even of the deserving poor, from recourse to the college infirmary. Even when the suggestion is made by the dentist, it is quite as often as otherwise regarded with disfavor. Many are unwilling to submit to the unavoidable publicity, others are well aware that the dental student is not the best conservator of time, and others again reflect that it is enough to endure their own sufferings at the hands of an operator, without being made liable to behold and participate in the sufferings of a score or two of fellow-unfortunates. These considerations are the profession's strong arm of defense against abuses in the dental colleges.

Again, in one view of the matter, the interests of the profession are constantly menaced by the work the dental colleges are doing in educating so many young men to become competitors with the present established dentists. A dozen or so new men swell the ranks of the city dentists with the close of every winter's term. It would be interesting to know what effect is wrought locally in such cities as Philadelphia, Chicago, St. Louis, and Cincinnati, by their entrance into practice. In the latter city we find by reference to the directory, about ninety dentists in active practice. Of this number, thirty-six are *recent* graduates of the Ohio Dental College. We include in this list only those who have offices of their own, not those who are attached to old establishments. Thirty-six new offices! Eleven years ago the then established dental offices in Cincinnati were only about forty in number. Possibly, something of this kind has been going on in Philadelphia.

Before concluding that the dental colleges of Philadelphia have done so much mischief to dental practice, it might be well to poison a score or two of these youpestiferous interlopers, in order to determine exactly where the evil proceeds. But if it can be shown that the dental colleges are exceeding their privileges, that they are aiming to secretly divert wealthy patronage to their doors, and stand ready to join in the hue and cry against the abuse. It appears, upon consideration, that no great amount of shrewdness would be required of unscrupulous managers to enable them to conduct the dental college as a monopoly. Let two or three shrewd, discreet men acquire control of the majority of stock shares and the result is easily done. It would be no very difficult matter to convert the large, public operating room into a dozen or a score of private offices, thereby removing one of the great bugs which frighten away timid, refined people. The students furnish all the labor, not only demanding no salaries, but really paying from \$50 to \$100 per term for the privilege of practicing and being instructed. Many of them are operators, and under the surveillance of the professors, the college would quickly gain a reputation for excellence and thoroughness of operations, such as might well alarm a private practitioner. Many of the colleges already enjoy such a reputation, well merited, too. It is a matter of concern to the student that his labor brings him no pecuniary reward. Be that as it may, he cannot afford to quarrel with the authorities of the institution. Unquestionably, by a little tact and management, the dental college could thus be made to return large revenue to the managers. However, come to think of it, we are not aware that students are required by any present existing regulations to operate every day. We have it, however, on the authority of two officers of a well-known dental college, that the operating rooms have been crowded during the entire legislative year, keeping a large class constantly busy. The uniform excellence of the work submitted for inspection

ve evidence of plenty of practice on the part of the students. Still, some students are fine operators at the time of entering college.

Finally, we do not know that the colleges are sacredly pledged to the profession to confine their ministration to the very indigent or pauper classes. Inasmuch, however, they look to the profession for countenance and support, it seems that deviation from what is presumed to be a proper cause, *i. e.*, avoiding whatever may injure private practice, may be regarded as justly censurable. Of course, a local practitioner could be expected to cherish and encourage an institution which, under guise of elevating the profession by properly qualifying entering members, stealthily invades the field which should be left to fair competition among outsiders.

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## Editorial, Etc.

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**NORTH CAROLINA'S AMENDED DENTAL LAW.**—Below will be found the text of the amended dental law of North Carolina, as passed by the Legislature.

*the General Assembly of North Carolina do enact:*

**SECTION 1.** That the section 3148 of the Code of North Carolina, beginning with chapter xxxiv of vol. ii, be stricken out and the following inserted in lieu thereof:

Hereafter no person shall commence the practice of dentistry who has not obtained a certificate from a Board of Examiners duly authorized and appointed in accordance with section 3149, and that part of chapter xxxiv which related to dentistry, which certificate shall be registered in the office of the clerk of the superior court of the county in which such person proposes to practice, for which the clerk shall receive a fee of five cents. Provided, this section shall not apply to persons holding a diploma from a chartered dental institute.

**SEC. 2.** Any failure, neglect, or refusal on the part of any person obtaining such certificate to register the same, as above directed, for a period of six months, shall work a forfeiture of the certificate, and no

certificate, when once forfeited, shall be restored, except upon the payment to said Board of Examiners of the sum of twenty-five dollars a penalty for such neglect, failure, or refusal.

SEC. 3. In order to provide means for carrying out and maintaining the provisions of this act, the said Board of Examiners may charge a fee of ten dollars for each person applying for a certificate, which no case shall be returned; and the funds so derived shall be placed in the hands of the secretary, to be used in defraying the necessary expenses of conducting the meetings of said board, and under no circumstances shall any part of such expenses come out of the treasury of the State.

SEC. 4. Within six months from the time this act takes effect, it shall be the duty of every person who is at that time lawfully engaged in the practice of dentistry in this State to cause his or her name, residence, date of diploma, or license and date of commencing of the practice of dentistry, to be registered with the Secretary of the State Board of Dental Examiners authorized and appointed as aforesaid, in a book kept for that purpose. The statement of every such person shall be verified on oath before a notary public or justice of the peace in such manner as may be prescribed by the said Board of Examiners, which shall provide upon application blanks for this purpose. It shall be the duty of the secretary of the board to furnish the clerk of the superior court of each county a certified list of the names of all persons in said county who have registered according to the provisions of the act; and it shall be the duty of such clerk to register such names in a book kept for that purpose upon the payment to him of a fee of fifty cents. Any person who is registered can practice in one or more counties upon filing in such county or counties a duly certified transcript of such registration. All persons now practicing who shall fail to register according to the provisions of this act within the time prescribed, and who shall offer to practice dentistry, shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not more than fifty dollars nor less than twenty-five dollars for each offense. Any person who shall knowingly and falsely claim or pretend to have or hold a certificate of proficiency granted by said Board of Examiners shall be guilty of a misdemeanor, and upon conviction shall be fined not more than fifty dollars nor less than twenty-five dollars for each offense. All fines and penalties recovered shall be appropriated to the school fund of the county in which the same shall have been recovered.

SEC. 5. Nothing in this act shall be so construed as to prohibit any one from extracting teeth.

SEC. 6. That section 8156 of said chapter xxxiv is not intended to apply to this act.

SEC. 7. This act shall take effect from and after its ratification.

## Obituary.

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JOHN McCALLA, D. D. S., died at Millersville, Lancaster county, July 28, 1867, of heart disease, in the seventy-third year of his age.

Dr. McCalla was born in the province of Ulster, Ireland, November 1814; came with his parents to Philadelphia in 1821. He was apprenticed to the tailoring business, and followed that trade in Philadelphia and Baltimore until 1846, when he commenced the study of dentistry with Dr. C. A. Harris, and graduated at the Baltimore College of Dental Surgery in 1848. He practiced for a short time in Philadelphia; then removed to Lancaster, where he continued to practice until 1857, when he retired from active life and settled in Millerville.

Dr. McCalla was one of the petitioners for the charter of the Pennsylvania College of Dental Surgery, one of the organizers of the Odontographic Society of Pennsylvania, and one of the founders and the first president of the Harris Dental Association. He ranked among the leaders of progressive dentistry, and was considered as skillful and expert in his profession.—*Dental Cosmos*.

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## Bibliographical.

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THE AMERICAN SYSTEM OF DENTISTRY—In treatises by various authors. Edited by Wilbur F. Litch, M. D., D. D. S., Professor of Prosthetic Dentistry, Therapeutics and Materia Medica in the Pennsylvania College of Dental Surgery.

The third volume of this voluminous work has been issued, and compares most favorably with the preceding volumes.

The contents of volume III consist of seven parts which treat of the following subjects: Part I. Anæsthesia and Anæsthetics, by Wilbur F. Litch, M. D., D. D. S. Part II. Physiology of Digestion, by A. S. Brunker, A. M., M. D. Physiology of Voice and Speech, by Carl Seiler, D. D. Part III. Diseases Incident to First Dentition, by James W. Litch, M. D., D. D. S. The Causes of Congenital Defectiveness and Deformity of the Teeth, by A. H. Thompson, D. D. S. Anomalies of the Teeth and Maxillæ, by S. H. Guilford, A. M., D. D. S. Hypercemen-



tosis, by S. H. Guilford, A. M., D. D. S. Reflex Neurosis Associated with Dental Pathology, by A. P. Brubaker, A. M., D. D. S. Inflammation of the Mucous Membrane of the Oral, Nasal and Pharyngeal Cavities, by W. T. Sudduth, M. D., D. D. S. Oral Surgery, Part I, by L. McLane Tiffany, M. A., M. D. Oral Surgery, Part II, by John Packard, A. M., M. D. Part IV. The Eruption and Structural Relations of the Deciduous and Permanent Teeth, by C. N. Pierce, D. D. S. Part V. Materia Medica and Therapeutics, by Henry Leffman, M. D., D. D. S. Part VI. Dental Metallurgy, by Ed C Kirk, D. D. S. Dental Jurisprudence, by Chas. G. Garrison, M. D. All constituting a valuable addition to dental literature. Publishers: Lea Brothers & Co., Philadelphia, 1887.

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**HOLDEN'S ANATOMY.**—The Dissection of the Human Body, by Luther Holden, late President of the College of Surgeons of England, Consulting Surgeon to St. Bartholomew's and the Foundling Hospital. Fifth Edition, by John Langton, Surgeon and Lecturer on Anatomy at St. Bartholomew's Hospital and member of the Board of Examiners of the Royal College of Surgeons of England. With over two hundred illustrations. Publishers: P. Blakiston, Son & Co., Philadelphia.

This is a concise, clear and practical treatise on Anatomy, and is adapted not only for students, but for members of the medical profession who wish to refresh their anatomical knowledge.

For the dissecting room this work is especially adapted, and may prove of great service in furnishing a work which is better adapted for such study as the cadaver affords than any other in use.

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**TRANSACTIONS OF THE ILLINOIS STATE DENTAL SOCIETY.**—The volume of proceedings contains many interesting and valuable articles, some of which are illustrated, which were presented at the 22d annual meeting, held in Jacksonville, May 10th to 18th, 1887.

THE  
AMERICAN JOURNAL  
—OF—  
DENTAL SCIENCE.

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VOL. XXI. THIRD SERIES—NOVEMBER, 1887. No. 7.

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ARTICLE I.

CAPPING EXPOSED PULPS.

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BY GEORGE H. CUSHING, CHICAGO.

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In the ten minutes allotted to this paper, the endeavor will be very briefly to outline the following points, viz.: The natural limitations of conservative treatment of the dental pulp; the reason why there is as yet so great a diversity of practice; the methods advocated by some of our best men; the necessary steps to be taken in order to secure the greatest likelihood of success, and some suggestions as to the probable cause of failure in many cases.

There would seem to be no reason, from a physiological standpoint, why exposed pulps should not be successfully treated and capped; but there is one anatomical peculiarity of these organs that places them in a somewhat different category from other organs or tissues of the body, which unquestionably limits the possibilities of conservative treatment.

This peculiarity lies in the fact that the pulp is located



in a cavity with absolutely unyielding walls, while its vascular and nerve supplies enter it through a very minute opening in the same dense structure; so that any swelling from inflammation or other causes, would produce greater or less constriction of the vessels of the pulp at the point where it is most essential that the blood and nerve supply should be uninterrupted and unimpaired.

Perhaps there is no one thing so difficult to do as to outline a comprehensive conservative treatment of exposed pulps which would be endorsed by a majority of the men in the profession. This is a confession that there is no well-established method which is based on scientific principles, and which is justified by *general* experience.

The methods of treatment are various, as advocated by different leading men, and are followed by the mass of practitioners blindly, because of their faith in the advocate who happens to be the favorite.

The chief and perhaps only reason why there is no some well-established practice, is to be found in the fact that, as a profession, we are not scientific in our method of observation.

We do not record our cases as we ought; we do not watch them with sufficiently critical care, and do not make sufficiently copious notes concerning them, but trust too much to memory, and *guess* too much about general results. The most conscientious observers will sometimes greatly err when trusting to memory to furnish the basis upon which to base opinions.

Then again, it must be borne in mind that there are comparatively few men who are competent for scientific observation, who see all aspects of a case, and see them without bias. Some men are over-sanguine, and can find no failures—from their own hands; others are not competent to recognize a certain class of failures when they do occur; others again are dishonest, and deny failures when they know they have occurred.

Until we can secure the co-operation of a number

best and properly qualified men to experiment scientifically in this direction, we are likely to have no well-  
ed method of practice; and, were we to secure these  
to do this work, years would have to elapse before  
conclusions could be verified.

There are two methods which are probably generally  
sued, distinguished by the names of the material used  
the capping; the one, the older, being oxychloride of  
the other the oxyphosphate of zinc.

Oxychloride of zinc has been used more or less since  
roduced by Dr. Keep, of Boston, in 1858 or '59; but it  
e prominently to the front about 1866, through the  
ocacy of Dr. W. H. Atkinson, of New York, who  
ned for it extraordinary success.

For some time this method was pursued very exten-  
ly, and with apparently gratifying results; but later  
e came to be a reaction, and so many cases that were  
posed to have been successful proved otherwise in the  
e of time, that the oxychloride of zinc came to be  
rded by many as the cause of these failures.

Its use was frequently attended with great pain, and  
y believed it to be too irritating, and that its irritating  
erty was the inauguration of conditions which cul-  
ated in the death of the organ, though Dr. Atkinson  
ned at one time that the pain and irritation were desir-  
features.

However, very many believed that something less ir-  
ing should be used, and it was supposed that it had  
a found in the oxyphosphate of zinc, and exposed pulps  
e capped with the latter material almost as extensively  
ney had before been with the oxychloride, and at first  
as supposed with greater success than by the former  
hod. Time, however, which tests all these methods  
orably, seems to have demonstrated that this material  
o more to be relied upon than was the oxychloride!

These experiences very naturally suggest the inquiry  
ther the causes of failure are chiefly to be sought in  
material used for the capping.

It is more than probable that the limitations imposed by the peculiar anatomy of the pulp before referred to, have more to do with many of these failures than the materials employed.

When there has been inflammation, or even irritation of the pulp, it is very probable that in many cases some permanent injury is effected by reason of the constriction of the nerves and vessels passing through the minor foramina and canals, which, though seemingly cured at the time of the operation, yet develop sooner or later—sometimes after years, sometimes in a few months—a condition which results in the death of the organ. We cannot know what conditions are present in the pulp except as outward symptoms indicate; and, though a pulp may remain quiet and seemingly healthy for several years, yet its death may occur at any moment.

It may very properly be said that the capping of an exposed pulp is always an experiment—frequently justifiable, and giving strong grounds for hope in its success, but still an experiment—but the methods pursued must of course have a decided influence upon the result. The most judicious and skillfully performed operations *may* fail, but those that are careless and slipshod are quite *sure* to.

The following may briefly describe the methods to be pursued:

The tooth should be isolated by means of the rubber dam. The cavity should if possible be opened so as to give a good view of its entire interior. The debris of softened dentine should be carefully removed without pressing upon the pulp, and without producing pain if possible—and this is possible more frequently than many are aware.

The cavity should then be saturated with pure creosote, which should be allowed to remain a few moments to become absorbed, when the cavity should be very carefully dried, and a drop of Fletcher's carbolyzed resin should be placed over the point of exposure and left for two

three minutes, when the excess should be dried off with absorbent paper; and then the whole surface of the cavity, which is to be covered with the capping material, should be varnished with copal dissolved in ether. When this has hardened, which will be in a few minutes, the capping, either of oxychloride or oxyphosphate of zinc, should be pressed over the point of exposure to the depth or thickness required. The capping material should never be *forced* into place, for injury may and is almost certain to follow any compression of the pulp. When the capping is sufficiently hardened, the filling, either temporary or otherwise, may be proceeded with. These instructions pre-suppose, of course, that the pulp is in a healthy condition.

As some of the other papers will doubtless consider it quite fully the treatment of diseased pulps prior to capping, this paper will only refer to the matter in a general way.

Diseased pulps should be treated for whatever condition presents itself, on general principles, just as other tissues or organs are treated under like diseased conditions. The idea that all exposed pulp should be treated alike, or with the same remedies, is preposterous.

The causes of failures in many cases may justly be referred to the anatomical limitations before alluded to; a point which has never been sufficiently recognized, and which should always be borne in mind in any calculations as to the chances of success.

Over this cause we have no control; but there are other causes of failure, within our power to modify; and these are, want of care and thoroughness in details. It should never be forgotten that in the treatment of exposed pulps, more than in any other special operation, the least neglect or carelessness is likely to prove disastrous.

As to the chances of success in this operation, it may safely be stated that after the age of twenty-five the chances are small, even with recent exposures and healthy pulps. Under that age, all cases in which there has been inflammation, though they may seem to do well for a while, are

to be regarded as liable at any time to fail; while in the cases where there has been sloughing of any portion of the pulp, failure is to be expected in a large majority of cases.—*The Dental Review*.

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## ARTICLE II.

### PULPLESS TEETH AND THEIR TREATMENT

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BY GEORGE H. CUSHING, CHICAGO.

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[Read before the Chicago Dental Society, May, 1887.]

In view of the fact that so much has recently been said and written upon the subject assigned to me for this evening, it would seem as though there could be no occasion for anything further being said relative to it. But our daily experience shows us the importance of bringing it before our minds—again and yet again—with “upon line and precept upon precept,” in order if possible to secure a more universally successful practice than now prevails. There is hardly a day passes but that some one witnesses the deplorable effect of ignorance or culpable negligence in this line of practice, and while this is so, it is incumbent on us to discuss and re-discuss the subject till both ignorance and apathy concerning it are dispelled.

It is not proposed, nor would it be desirable here to attempt an exhaustive study of the subject, and this paper will only endeavor to emphasize some of the more important points which should be observed in order to insure success, and to try and indicate the more frequent causes of failures in the treatment of pulpless teeth.

Pulpless teeth are not necessarily *dead* teeth. They are frequently so miscalled, however, and the miscall leads to a misconception of their true conditions. The destruction and removal of the pulp of a tooth rests primarily in simply depriving the dentine of its chief



haps only source of nourishment. It does not at all affect the integrity of the tooth as to its connection with jaw, or as to the nourishment of the cementum whereby its integrity is maintained. If, then, after the pulp is destroyed and removed, the tooth can be put into such a condition as not to provoke disease of the parts with which it is intimately associated, it may reasonably be expected that it will be retained as a useful member for very many years or even through a long life time. This being accepted as true, the first and most important inquiry is, what is the source of diseased conditions attending pulpless teeth, which do not show themselves in connection with those containing living, healthy pulps? There can be but one answer to this question, viz: that septic matter contained within the pulp chamber or canals furnishes the sole irritating cause resulting in pericementitis, alveolar abscess, necrosis of the alveolar process, and sometimes of large areas of the maxillary bones. This can not be too strongly and persistently impressed upon the minds of the younger members (particularly) of the profession, though many of the older members would do well to give this fact greater consideration than they seem to do, for this is the very key-stone of the problem of successful treatment.

Obviously, then, the first step in the treatment of such teeth is the removal from the pulp chamber and canals of all septic matter. This, of course, renders them aseptic, and of course employs in its accomplishment some of the various methods of disinfection.

To secure this condition, what then are the very important points to be considered? First, the isolation of the tooth to be treated, by means of the rubber dam or rubber cups. Second, the use of properly adapted instruments for the removal of the contents of the pulp chambers and canals, and last, but not least, the thorough disinfection of the instruments before using.

While it is possible that teeth treated with but slight regard to the above requirements may sometimes give but

little trouble, yet the neglect of any one of these pre-factors may render treatment tedious and difficult, which would have proved brief and simple had they been strictly observed, and such neglect may, and sometimes does, result in most disastrous consequences.

This aseptic condition having once been secured, the next consideration must be to render it permanent.

It is self-evident that if all septic matter is removed from the canals and pulp chamber, and they are then filled with an indestructible material which cannot be penetrated by moisture or by septic matter or gases, and does not cause contamination with or before it, the tooth must then indefinitely maintain its integrity as far as the conditions under consideration are concerned.

The point most important to be next considered is the introduction of the material with which the canals are to be permanently filled. Fortunately we have in gutta-percha a material that may be made to fill all canals with approximate perfection. This should be introduced with the greatest care so that the apical end of the roots may be perfectly closed. There should be no hurry about this part of the operation, but ample time should be taken to insure the desired result. The solution of gutta-percha in chloroform of the consistence of thick cream should be used at first and pumped in till there is assurance that it has reached the apical foramen. This should be done with smooth broaches adapted to the size of the canals. Gutta-percha cones should then be used where practicable, and they should be thoroughly packed. In very diminutive canals, or those of difficult access, small gold points fitted to fit such canals (as suggested by Dr. Wassall) should be used; after the solution had been well worked in, the points should be forced as far into the canals as possible without extending beyond the foramen. They act as wedges to force the gutta-percha to its place, and are useful when nothing else could be used.

The above briefly are the points to be kept prominent

our minds, and a faithful working out of details under  
m cannot fail of success.

Now a review of the most frequent causes of failure  
ould seem to be unnecessary after having indicated the  
st important points to be observed essential to success,  
cause it is obvious that a neglect of some one or all of  
essentials claimed must be the cause of failure in almost  
cases, yet it may be profitable to dwell upon them for a  
ment that we may be fortified against the temptations to  
eless methods which so often present themselves in the  
urse of treatment of this class of cases.

The most potent cause of failure undoubtedly arises  
n a want of thorough comprehension of the first pro-  
ition laid down at the outset of this paper, viz.: that all  
se troubles arise from septic poisoning, and, in con-  
tion with that, of the failure to understand what disin-  
ion really is. It seems to be impossible for some minds  
grasp the idea that all the troubles which we so fre-  
ntly see in connection with pulpless teeth can arise from  
ptic poison. The cause to such minds not being tangi-  
is beyond their mental grasp as well, and while nomi-  
ly accepting the theory, they say by their actions that  
y do not believe the cause to be as stated. Such a lack  
confidence in the fundamental premise must of necessity  
et carelessness in the methods pursued, which inevitably  
lds to bad results.

Again, the want of confidence in the premises here  
d down is the result of neglect to study the subject by  
se who would fully comprehend it if they chose to apply  
ir minds to it.

Indifference again as to the results comes sometimes  
n a feeling that the compensation to be received will  
justify the time and trouble necessary to the accomplish-  
nt sought. Fortunately such ignoble motives are not  
n found actuating half-way reputable men.

But the chief causes of failure after these, are to be  
ibuted to a lack of thoroughness in performing the



details of the necessary operations. This will often be found to occur with those who are well posted, and who endeavor to do and think they are doing the very best that can be done. One man will fail to remove all the debris while believing he has done so most thoroughly; another will remove most perfectly the contents of the canals, but fail to thoroughly disinfect them before filling; while still another may perform the first two steps in the most admirable manner and yet fail most sadly to properly fill the canals.

Men's minds are so differently, and I might say curiously, constituted that all these errors will sometimes occur at the hands of men regarded as scientific, and who would be supposed to be thorough in all their methods.

A celebrated man, one who is high authority in the scientific world—and justly so, too—was observed to test the mouth with litmus paper which he held between his naked fingers. Conclusions drawn from such observations could hardly be valuable. If such men sometimes pursue unscientific methods, it is not to be wondered at that among those less highly educated such practices will occasionally occur.

This brief summary of the points essential to be observed to insure success on the one hand, and the dangers and errors to be avoided on the other, evidently can lead to but one conclusion, viz.: the importance of a thorough comprehension of what is needed to be done, and a practical training which shall evolve the skill necessary for performance. This can come only from free discussion and clinical demonstration and practice.

It is hoped that the former may be induced by what has been suggested herein, and that such details as may profitably be considered here, and which were purposefully avoided in the paper, will be introduced in the discussion which may follow; while the clinical teaching which should supplement the theoretical may be furnished hereafter, as has been intimated that plans for a regular series of clinics are in contemplation.

Believing that this subject can not be too fully discussed, and with the hope that what has been said may stimulate some at least to a more earnest study of this most important subject, the paper is left in your hands.—*The Dental Review*.

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## ARTICLE III.

## "VACUUM" PLATES.

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BY W. E. SWIGERT, D. D. S., SPENCER, IND.

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A lady once told me that the reason her mother couldn't control her upper plate was, because I hadn't made the "air chamber" in the right place, and it was the wrong shape. She had examined several mouths and found that Nature had provided a portion of the palate especially for an "air chamber," had made it a peculiar shape, and I had failed to fit it. The blow staggered me. I was dumb with amazement, and found great beads of sweat "slowly and sadly" trickling down my *manly* face, and a ghastly smile o'ershadowed my ghost-like countenance. I could but realize and admire the great truth that a superior mind, in one short observation, had discovered what I had failed to in all the years I had practiced dentistry, and I exclaimed, "Success to thy genuine, Oh, Woman!"

But, seriously, is the vacuum really a good thing? Rather, is it not a myth and delusion? Aye, more, in some cases it is an absolute injury. I cannot account for the persistent use of the vacuum plate by so many dentists, on any other ground than that of ignorance, or, rather want of disposition to investigate.

The per cent. of dentists who follow in the old rut of their preceptors, who make dentistry a mere trade, to be worked at only for the money, who care not for the best

methods, but are willing to accept the first given as good enough without further investigation, is surprisingly large.

Take, for example, the air chamber. How many of our "shining lights" will persist in using it in all artificial dentures? And what per cent. of them can give an intelligent reason for so doing?

I believe the principle upon which an exhaustion plate is made *will condemn the vacuum*. What is necessary to secure the most perfect adhesion to the mouth? I require *perfect adaptation*. By this I do not mean to merely take a good impression, with the parts in their natural position, and make the plate fit the model taken from this. Far from it. In the majority of cases such a plate will not fit, because there is not perfect adaptation. Perfect adaptation is when a plate is in place in the mouth and the air exhausted, there will be an equal pressure over the entire surface, thereby producing a perfect adhesion. Hence, in the majority of mouths, there will not be a perfect fit, because the pressure will not be distributed equally, for the reason that in all mouths will be found inequality of texture, and the plate will press harder on the more solid tissues than on the softer. By examining a few mouths any one can easily satisfy himself of this fact. Examine the palate of a mouth, posterior to the plate, and what is found true there will be found true of other parts where there is an inequality of tissues. I have seen plates, because of the unequal pressure, that would almost bruise the harder parts, while they barely touched the softer. Not because of a bad model, but for the reason given above.

How to equalize this pressure and secure perfect adaptation is the important question here. I would suggest that we study well the mouth, going over it again and again, using pressure to find what parts are soft. Note in what direction the soft tissues should be pressed, to be in as easy and natural a position as is possible to have equalized pressure and adhesion. Determine the extent to which they should be forced. Keep in mind the fact that

much pressure on the soft parts will cause correspondingly less on the harder, thereby making as imperfect as the reverse. Take the model, which should be a perfect counterpart of the mouth, with all tissues in a perfectly natural position, and note on it all the inequalities. Apply the model and mouth together, until as familiar with the model as though looking at the mouth. For an accurate result will now depend upon the work done on the model. With a suitable scraper pare off the model where the tissues are soft in the mouth until satisfied that adhesion will be as strong as on the harder parts, remembering the direction in which the tissues in the mouth should be pressed, and obtaining as near as possible the natural shape of the model.

To obtain a perfect result, will not only require good judgment, but a good stock of patience, perseverance and practice. Every failure will be only the forerunner of a victory. Do not expect to become perfect in a few trials, disappointment will be the result; for, to obtain a perfectly equal pressure and adhesion, I believe is only a thing of theory and probably impossible to gain, but strive to reach it and the result will be a surprise.

If perfect adaptation is necessary, I do not think it is attained with a vacuum. An equal pressure and adhesion over the entire surface of the plate can be obtained only by equalizing the firmness or solidity of the tissues. Is this done with a vacuum? No. A plate with a vacuum will pull the soft parts down to the chamber, drawing them from under the plate, where it is made to fit, thereby changing, to a certain extent, the shape of the mouth from the shape of the plate. And how often do we see, in cases of this kind, a distorted, inflamed, and honeycombed or papulous condition of this portion of the mouth?

[This subject is not new; but it is not hackneyed, and common order till common sense shall govern us in the adaptation of plates.—ED. JOURNAL.]—*The Ohio Journal of Mental Science.*

## ARTICLE IV.

## THE SIX YEAR MOLARS.

BY A. J. SMITH, D. D. S.

*Mr. President, Ladies and Gentlemen:* There are perhaps, no teeth about which more has been said than the first permanent molars; and there are none more in need of further consideration, because there are none more valuable and none more neglected. My subject, therefore, "those old and threadbare," is yet one of importance.

I will not presume to advise what is best to be done for these teeth in their different conditions, but will briefly tell you what I do for those that come under my care. There is no operation in the practice of dentistry that appeals to my sympathies, or goes so against my inclinations, as the extraction of these teeth for children.

First permanent molars coming under my care soon after the second ones have erupted, I fill, if they give promise of lasting three or four years, telling the patient that if we can save them only that long we may then know of some better way of saving them longer, and will prevent the second permanent molar from tipping forward. This will be worth more than the cost of filling the other tooth. Yet, like all other rules for these teeth, there are exceptions to this one. If the pulp is dead and periosteum and gum inflamed, I generally extract at once; or if the teeth are already crowded and some irregularity exists that additional room will correct, I consider that extraction is indicated.

The treatment of the first permanent molars, after the second ones have erupted, is an easy matter compared with the treatment of them before. These teeth are so imperfect and incomplete in structure as to render them susceptible to caries, and they appear at an age when the child has barely emerged from infancy, and still requires the gentle handling demanded by tender years.

It frequently happens that the child's first introduction to the dentist is brought about by the aching of one of these teeth. Only a few days ago a father came to me with his little delicate seven-year-old son to have something done for the toothache. Upon examination I found the trouble to be in the left inferior first permanent molar, which was in a deplorable condition; the enamel entirely gone, except a small ledge on the buccal surface; the dentine a pulpy mass of about the consistency of cork; pulp nearly exposed and highly inflamed; had been aching for three days. This was the child's first acquaintance with a dentist, but he had a very distinct recollection of meeting a physician only a few days previous, who mistook the mate to this one, the right inferior first permanent molar, for a temporary tooth, and attempting to extract it as such, broke it off just below the gum, leaving a live pulp exposed, and the boy with a horror of having a tooth extracted. I advised the parent that this tooth was beyond redemption, and the only means of relief in extraction; upon which the boy's courage seemed to fail at once, and he began crying and vowed he would not have it out. I suggested giving the boy an anæsthetic and taking the tooth out without pain, as it would be a pretty severe operation, and in the face of the misfortune he had experienced with the other one, I did not wonder at his not having the courage to undertake this operation.

But the father opposing the anæsthetic, I told the little fellow I would put something in it to keep it from hurting for a while, and see if we could possibly save it, my object being to gain the boy's confidence and get him and the tooth in better condition for the extraction. After removing as much of the pulpy dentine as I could without much pain, and drying the remainder with cotton chloroform and the chip blower, I saturated it with carbolic acid and placed a rubber ligature around the neck of the tooth and dismissed the little patient until it gave him further trouble. The next day they returned, with the opinion that the tooth



could not be saved, and as it was considerably loosened with a little encouragement the boy consented to have it out. The operation was more severe than the child expected, yet it was much easier than it would have been but for the work of the ligature.

First permanent molars, giving trouble by the 7th or 8th year, I, as a rule, endeavor to save until the 9th or 10th year, if I can get them before the pulp dies or has to be destroyed, as frequently the deficiency of ossific material will have been supplied by this time and the tooth then may be permanently filled; and, if not, a child is better able to stand it and can better afford to lose it then than soon after, and it will yet be in time to allow the second molar to come forward bodily, instead of tipping.

Yet, there are cases, like the one described, in which there is no opportunity to give even temporary relief, and extraction seems the only resource; in such cases I consider it the part of kindness and humanity to use an anæsthetic, as children possess thorough immunity from the danger of them. Besides, it is desirable to avoid severe pain with children that we may not create a life-long dread of dental operations, which is so often due to the keen remembrance of suffering in childhood.

I have no definite or specific rule for extracting or saving first permanent molars, nor do I think any is practicable. What seems to me to be far more needed is to instruct and educate the parents to have their children's teeth cared for in time. Many parents think no attention is necessary to the temporary teeth, and know nothing at all about the first permanent molars until they are badly decayed and aching, and are informed by the dentist that they are permanent teeth. Then they say, "I thought they were baby teeth, or I would have had them filled long ago." Hence, the importance of parents knowing the necessity of having their children's teeth cared for at an early age.

The almost total lack of popular dental literature giving

struction on the most important of all subjects that effect health and comfort of the people, is not altogether creditable to the dental profession, for it is to the dentists that people must look for right teaching along this line.

About the only hope of restoring perfect teeth to future generations, lies in the care and intelligent use of means placed in the reach of the mothers. To them, and not to the dentist, is committed the trust and responsibility of remedying many of the defects from which we now suffer, but the duty of proper instructions is with the dentist. Now, some one may say that for us to give this instruction is an endless job for which we would get poor pay. So it may seem to many of you at first thought, but each of us would go to work earnestly, and embrace every opportunity of imparting a few words of advice to parents regarding early attention to their children's teeth, in a very few years we would be able to see progress, not only by better teeth of children, but by a higher appreciation of our profession by the public generally.

One writer on this subject has said that the time will come when we as dentists shall feel largely responsible for the original character of children's teeth, that we are mere workmen in the art of dentistry, and so, subordinately professors in its science; that we feel little responsibility for instructing our patients. We call our patrons patients, when they come to us more as customers, and therefore only for our skill. But when they come to us for advice and are able to sustain ourselves as teachers, we will have a better claim to the title of professional gentlemen.

Our relation to those we serve and to the public should be of so much confidence, dignity and learning, that others will come to us for instruction to prevent bad habits in their children, that shall reach their own habits or to their children coming into the world. Our patients should be made to feel that our advice is worth as much as our skill. But this can be established only subsequently to the education of the people.—*Transactions of the Indiana State Dental Association.*



## ARTICLE V.

## ANTISEPSIS.

BY M. H. CHAPPELL, D. D. S.

*Sepsis*—Putrefaction.

Anti "*Sepsis*"—To prevent, arrest, or destroy germ chemical changes or putrefaction.

*Putrefaction*—The disorganization of animal tissue, the formation of new organisms, microscopic or otherwise relating to *corpuscle* life.

*Fermentation*—The action by chemical re-agents, as result of light, heat, etc., and the development of corpus life, bioplasm in vegetable substances.

Antiseptic remedies are used to destroy, arrest prevent, any of the conditions which would result in inflammation or terminate in suppuration or putrefaction.

The terms used, such as putrescence, disinfectant escharotics, septicæmia, pyæmia, etc., must all be duly classified and used in their proper order.

Antiseptic treatment in wounds is to prevent that condition of the tissues, in its process of repair, either from the ravages of specific inflammation or from what was formerly called granulative inflammation, which did not throw off laudable pus, and to arrest the process of disorganization, putrescence, gangrene, dry or soft, or the formation of mephitic gas, which is so easily detected by the smell.

Therefore, antiseptic treatment is the rational method of wounds so as to prevent inflammation and restore the part by promoting the organization of lymph into formative or reparative tissue. This is done by the use of agents that will prevent the proliferation of micro-organisms or if developed and manifesting their presence, resulting in fever of the parts, leading to inflammation and ulcer.

ation. Antiseptic remedies are of various degrees of strength—some are restrainers, others are destroyers, hence some germs may be developed, but rendered sterile by low strength preparatives, while the low strength in using are aimed as preventers or restrainers, and not destroyers. Many of these agents are pleasant, not powerful in action, but limited in their powers as restrainers, while others are non-offensive, but powerful in action, effective in purpose, and satisfactory in results.

The surgeon of to-day who honors his profession is an enthusiast in the science of antiseptics, or, rather, anti-germi-sepsis.

The germ theory in the treatment and management of wounds, as well as in disease and its prevention, is the king of theories in the healing art to-day.

Germicides are the antiseptics for us to consider, investigate, and make practical application thereof.

The surgeon who now takes a pride in his profession will not attempt to perform any surgical operation unless he has the means available that are essential to prevent germs coming in contact with the wound, either from his hands, instruments, atmospheres, flaculic or other means, and all these must be antiseptized.

We, as dental surgeons, have operations that result in very unpleasant terminations, and as the conditions for major and minor surgery are the same only in extent and responsibility, we must be informed and governed accordingly.

In the treatment of pulpless teeth, putrescent canals, ulcerating peri-dental membranes, alveolar abscesses, pyorrhœa alveolaris, in the treatment of carious cavities in teeth prior to filling, and wounds of the mouth and face, give us a large field for practice. There are but few, if any, mouths but that are daily offering in some parts conditions for the development and growth of germs, either formative or nomadic. These germs may be from an animal or corpuscle origin, owing to their cause or resting place, while others are vegetable, and either may produce similar results.

It is a known fact that vegetable substances can be anesthetized and held dormant, as well as the highly organized corpuscle life. Hence, we see that some strains of antiseptics act only as restrainers on germs that will gain life, and may be more definitely fertilized and become aggressive in diseased action.

Our pharmacists, and those who take a pride in developing new remedies in materia medica, have given us a long list of antiseptics and germicides. It is not safe to adopt *one idea* only in thought—mental philosophy—this endangers the machinery for developing other thoughts, and hence insanity, with its dangers and misfortunes, even in the realm of thought. So it is if we adopt “one remedy.” We must comprehend the whole, and observe that the world moves and the tides flow.

Time will not permit a full discussion of this subject, and I will present only a few remedies and their uses.

Bichloride of mercury has for ages been considered too violent a poison to use as a medicament, but as lightning is tamed and trained to do our service, so this corrosive sublimate. Its most valuable use is that of a germicide. It is pleasant in use and reliable in destroying germs and preventing inflammation, and assists in speedy recovery. I use it in various strengths, and it is claimed to be a restrainer, or even destroyer, at 1-60000.

For the purpose of practical use, the following table of weights of fluids will not be amiss:

- 1 gallon distilled water, 10 lbs.
- 1 pound, 5,760 grains.
- 1 ounce, 480 grains.
- 1 drachm, 60 grains.
- 1 minim, 1 grain.

Apothecaries' weight.

Hence the varied strength can be approximated. For irrigating purposes, such as washing out with syringe and textile siphon, the 1-1000 to 1-2000 strength is required.

For dental use I irrigate with syringe all mouths

are any way affected with putrescence. Warm water, or rather rain water that has recently been boiled or distilled, is required for the solutions in immediate use in cases heretofore described. And for all carious cavities wipe out with pledget of cotton saturated with the 1-200 solution; then dry with borated cotton and paris green and bichloride powder.

In putrescent canals irrigate with syringe and 1-1000 solution. Be observant that in exploring no debris is forced through the foramen, and if a discharge is flowing this must not be checked. Pack the cavity with borated cotton, wet with the bichloride solution. Fill mouth of cavity temporarily with oxyphosphate.

In pyorrhœa alveolaris cleanse by removing all extraneous substances, then apply by irrigating with the warm water solution 1-100.

The stage of disease and its character will in some cases indicate some remedy of different properties, like iodine or sulphuric acid, as hereinafter mentioned.

Some may inquire as to the toxicant dangers and in what would they consist—salivation, with griping pains, but no fatal results. In no case of dental surgery is there any danger of poisoning.

I can not pass this part of my subject without insisting on each of you to become missionaries among your family physicians and surgeons and inquire of them if they "have the light" of *antiseptis* in the treatment of wounds, and especially in the use of bichloride of mercury 1-1000 solution. If they *have not this light*, proceed to tell them of the "balm in Gilead," and of the wonderful results.

When you go home prepare your solutions, if you have not already done so, and make practical the information you have on the subject.

Carbolic acid possesses varied properties. Escharotic, germicide, germ restrainer, disinfectant, antiseptic, and stimulation, in accordance with the strength used. We have observed the application of carbolic acid, full strength,

to putrescent canals and fresh wounded extirpated canals alike, when neither was indicated.

When we desire a line of demarcations in a cold abscess, and the curing, like bacon is made of the decalcified residuum in white or yellow decay in dental caries; when we wish to fill over and destroy or restrain the germs there, then full strength is required. But as a germ restrainer and killer, 1-30 solution will be sufficient, either as a disinfectant or antiseptic.

Peroxide of hydrogen is a wonderful effervescent agent when it comes in contact with pus, blood, or saliva. In cleansing or freeing abscesses, or putrescent pulps, or foul gums, of all puss, it is valuable. But owing to the trouble of losing the extra equivalent of oxygen, in some cases our success is not satisfactory, although a good article gives good results.

Iodine in tincture is not only a germicide, but it is the most powerful and successful *resolvent* stimulant known. It promotes the process of *resorption* of the waste tissue and facilitates the leucocyte scavengers in the blood to seize and destroy any germs or broken down pabulum that can not be formed into protoplasm, and it is eliminated through the kidneys or other excretory glands. It promotes a flow of organizable lymph for provisional tissue. Hence the indications in all debilitated, sluggish, or special troubles, where healing will not proceed, then iodine is indicated, and the strength required is suggested by the prognosis. In full strength, or a syrup of the metal, iodine is a powerful escharotic, while a tincture, and even in solution the resolvent stimulant qualities are valuable.

Sulphuric acid is a valuable agent in the mouth. If we use it full strength, it is an escharatic and powerful germicide. In scaling and polishing teeth, I use a solution after scaling and before polishing, to cleanse all the carious ends of enamel roots when the teeth are attacked with green stain—a form of caries—and if decalcification takes place, sulphate of lime is left which the green stain decay will not attack soon.

In children's teeth where the secretions of mucus are vitiated, caries, white, a valuable daily wash, is made 1-100 solution aromatic sul. acid, preparatory to further operations in removing carious debris and correcting the mucus glands.

Iodoform is an excellent dressing for putrescent canals, if not the best, when sealed and changed daily.

Benzoic acid I use with borated cotton for packings and other dressings.

Sanitas, eucalyptus and other antiseptic agents are mild and pleasant germicides. We must admit that with many individuals some remedies have but little sanitive effects.

For two years I have been a student and an investigator into the practice of antiseptis, with the aid of standard works like Wythe on Surgery, Pilcher and Morris (1887 edition) on Wounds.

I have in my possession two photos of a little girl four years old living in Kennard, near our place, and its mother, having become violently insane, with three strokes of a hatchet crushed its skull to the depth of one and one-half inch, making a ghastly wound. The papers reported the killing of the child. As life was apparent, Dr. E. O. Holway, of our place, who is an enthusiastic advocate of antiseptis, was called, and soon removed the broken bones and nearly a teacupful of brains, and then used nothing but the 1-2000 bichloride solution on borated cotton dressings. After eight weeks' treatment the child is now running about as well as usual, save slight paralysis and a severe scar. The mother is yet in the State hospital for the insane. This is the most wonderful case I have known in our neighborhood, and all to the credit of antiseptis.—  
*Transactions of the Indiana State Dental Association.*

## ARTICLE VI.

OPERATIVE DENTISTRY AS APPLIED TO  
DECIDUOUS TEETH.

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BY DR. WM. N. MORRISON, ST. LOUIS, MO.

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The text-books, and notably Tomes and Harris, are very meagre in their treatment of deciduous teeth. The journals are more advanced, and through them Profs. J. White and J. H. McQuillen have battled nobly for their retention. In the "American System of Dentistry," the treatment of deciduous teeth are highly esteemed, and their rational treatment plainly set forth. It says:

"Well constituted amalgam and tin foil are the most durable; and on the whole make the most satisfactory materials to use. As little children cannot employ the means to cleanse the teeth which adults use, the adjoining surfaces of fillings should be brought into contact at the risk of the recurrence of decay. If spaces are permitted to exist, they become packed with ingesta, which leads to soreness of the gums, disuse of the teeth, and the early currence of decay."

The profession is still far in advance of both the text-books and the journals, and to the "Grand Old Man," Dr. W. H. Atkinson, are we most indebted for the progress of ideas in regard to the preservation of these teeth. At no period in our professional history have the deciduous teeth received so much intelligent preservative care as they do to-day. And yet there is much that could be done in this direction that is cast aside as a mere trifling matter, and the tooth extracted for want of time to treat it, or to give the parent a few hours more sleep.

In my earliest recollections of discussions in the St. Louis Dental Society, more than a quarter of a century ago, a prominent member, in the most tragic manner, a

serted that if it were possible, with a keen scimiter to excise the entire deciduous process and teeth from the jaw, no unfavorable effect could be observed in the permanent teeth when the individual had arrived at maturity. The floor was very eagerly occupied in debate by Leslie, Dunham, Peebles, Comstock, Barron and Forbes, who are now delegates to that Society from which members never return.

When around the festive board, at the close of the meeting, it was explained that the tragic statement was not meant to be taken in its literal sense, but was intended to waken the members to a discussion of the subject, such as its great importance demanded. It certainly had that effect and only intensified the general jollification which followed.

It should be our aim to save all of the crowns in their natural shape and position, and by a proper degree of care keep them thoroughly cleansed, thereby preventing their decay.

Simple, regular-shaped cavities can be filled with gold, in cylindrical form, preferably; and it would be an exceptional case where retaining pits would be admissible. Continuous malleting, or much force, should not be used upon these delicate organs, separated as they are by so slight a framework from the more delicate permanent ones in their impressionable formative stage.

Amalgam has a wider range of usefulness, and can be used for simple cavities; and for the larger and more complicated it has no superior.

I would not excavate heroically, as too much cutting and excavating only endangers the life of the pulp. Do not gratify that desire to take away one more layer, just to see how close you can go to the pulp and have it live under the filling; leave the soft denture over the pulp tissues, securing slight undercuts only, merely enough to prevent the fillings from being lifted from their beds. When pulps are exposed, they should be capped with gutta percha dissolved in chloroform, or phosphate, where there



is the slightest hope of their remaining alive; but when they are dead, I remove all the tissue from the pulp chamber and canals as thoroughly as possible, and disinfect the canal with a little wood creosote to arrest hemorrhage and purify the canal, and then fill the roots and pulp chamber with the gutta percha mixture, and the external cavity with amalgam, being careful to polish the amalgam fillings at subsequent sitting.

The phosphates and gutta percha are of too uncertain action, and too temporary in character, for even deciduous teeth, gutta percha being acted upon by the secretions of the mouth and swelling out of the cavity, and the phosphates being too readily washed away.

About the time the centrals are erupted, there is considerable pressure on the approximal surfaces, and when decay at those points is neglected, the surfaces seem to drop quite into each other. Now, in the last instance, wedge them open with cotton for a few days, and if the cavities are of such shape that individual fillings cannot be made so as to retain themselves in each tooth separately, they would block the entire space full, reaching from the undercut of the enamel of one crown across to the undercut of the other tooth, leaving the whole mass of filling bridged from one tooth to the other, vastly improving the power of mastication, keeping the arch braced to assist in the development of the second teeth, which is taking place below.

I rarely extract the devitalized roots, but fill them and grind them smooth, and but little short of occlusion.

Educate the parents, as well as the children, and then there will not be the exclamation when they bring a sixth-year molar, decayed almost beyond recognition, "I thought it was a baby tooth!"

Too much sweets and trashy diet are the cause of such imperfectly organized teeth, and the approximal pressure on the vitreous enamel, surrounded by such secretions greatly accelerates their decay. Teach patients how

forcibly oxygenate their blood with the purest out door air they can get; filling the lungs to their fullest extent, holding it a moment, and then contracting the chest muscles upon them, thus forcing the air into the remote territory which is not used on ordinary occasions. Use boiled water to drink, whether hydrant, cistern or well, purifying it by bringing it to the boiling point, thus destroying much organic life which could not be other than harmful. Use sulphur as a dentifrice, to destroy any parasitical life that may escape. So, with nature's bountiful gifts—pure air, pure water, and a plain diet and plenty of sunlight—a magnificent physique will be built up and the race improved. By this line of treatment, in a few generations, irregularities of the permanent teeth would be of very rare occurrence.

The "Hearth and Home" is doing a noble missionary work towards educating the public in the care and preservation of the teeth.

Let all of our efforts upon these teeth be towards their preservation to the very last hour the individual can make any use of them; and let it be our aim to impress upon parents the necessity of proper care and attention on their part. The value of deciduous teeth has never been fully appreciated by parents, and too little care bestowed upon them. I regard them as being just as important in their sphere as permanent teeth are in theirs.

I beg leave to submit for your examination a few casts to illustrate the line of treatment.

In a paper on "The Treatment of Deciduous Teeth," read before the St. Louis Dental Society several years ago, I set forth at some length my method of treating deciduous teeth; by an oversight this article was not published at the time, but appears in the May number of the "Archives of Dentistry." I most heartily commend it to your careful consideration.—*Transactions of the Illinois State Dental Society.*

## ARTICLE VI.

## THE USE OF THE MICROSCOPE IN PROGRESSIVE DENTISTRY.

BY L. L. DAVIS, D. D. S.

The microscope has long been regarded as a mere toy, capable of affording amusement only, but its importance and usefulness grows every year, and there seems no limit to the extent of its services in all professions and trades. While it pours out its greatest tribute to the medical profession, yet druggists, merchants, bankers and lawyers claim its valuable assistance. One detects drug adulterations, another examines the threads of the fabrics offered for sale, or tests the genuineness of a signature.

The dentist, too, has need of its aid, and it is for this purpose of showing those needs this paper is written.

To-day there is no instrument in existence that compares with it in the discoveries made by its use, which have helped the cause of science. To-day the men of whom the masses speak the most are men whose labors with this instrument have brought them into public notice. Even ignorant and unlettered people have heard of Pasteur and Koch, and what dentist has not heard of Black and Miller, Abbott and Brædeker, Sudduth and other prominent men in the profession who give this study their special attention.

By means of the microscope man has unveiled the mysteries of nature to which he has so long been blind, and new worlds are now open to research, and permanent fame awaits the earnest seekers after knowledge in this attractive field of study.

The present importance of this instrument warrants the assertion that it is to become one of the prime educational tools of ensuing generations.

Anatomy with all its attractions and splendid pro-

jects is left far behind in the race for highest knowledge of the human form.

The surgeon who looks in your face and sees not only the lines, angles, prominences and depressions which form the features, but traces beneath the surface-tissue the nerves, arteries and arrangement and attachment of the muscles to the bony frame-work, may feel a worthy pride in his greater knowledge. But what words of mine can express the feelings of the microscopist as he takes that nerve, that artery or that muscles and resolves it into the most minute and primitive cell structure, and arranging and classifying each tissue component that are the genesis of that highly organized being, man, till he is almost able to *grasp* the vital principal called life.

The cry for post-graduate study has gone forth and an able scheme or schedule for such study has been prepared by Dr. Moody, yet could I so influence the profession, I would have every man with microscope in hand as a necessary adjunct to all his future work.

To whom does dentistry owe its greatest honor? to the mechanic with his wonderful skill in restoring lost organs; to the operator in repairing the ravages of decay, or to those men who, by their painstaking study have placed within our power the means to *prevent* decay?

Inoculation of a mild form of virus has made it possible to withstand the most horrible of all diseases. The germ theory has received such strong indorsement from all thinking men that it stands firmly and resists the puny attacks of those who, from want of education or their natural surroundings, can only believe what is possible to them, and thus give us a "bug" theory.

You are all familiar enough with Dr. Black's experiments in cultivating germs or fungi to be forced to acknowledge that something does develop from a very small beginning, and the microscope shows that small beginning to be a minute rod or ball, that has the property of reproducing its like in places favorable to such growth.

What blind seeking in the dark, what vague theorizing would arise had we not the microscope to aid us in our work.

The knowledge of physiology is essential to the study of pathology, and in dentistry the minute anatomy of tooth structures should be as familiar to the operator as the shape of each individual tooth, as also the changes in tooth structure by disease.

Only a few years ago the number of medical and dental colleges having the study of microscopy in their curriculum could be counted on the fingers, but to its prominence has this instrument forced its way that to-day no college of repute dare slight the study. That a student should become so versed in histological study during the short time spent in college, as to prove an expert, is more expected than is his studies in any other branch, such a foundation should be laid, and the study made so attractive that his after life may prove the efficiency of his teaching.

The University of Michigan was among the first to recognize the importance of the microscope in medical study, and slowly but surely the other colleges followed her wake, then the dental students were brought into action and again the colleges responded.

The Chicago College of Dental Surgery has, from the beginning, recognized the value of this study, and by the stimulus of Prof. Black's teachings, is to-day the first dental and medical college in the world to have in its equipment a complete apparatus and laboratory for the furtherance of bacteriological investigation. While practical methods of filling teeth are of paramount importance to the dentist, there are those whose thoughts may give vent to such expressions as "What do I want to know about something I can't see without a spy-glass?" "Teach me how to fill teeth better, or make a better fitting plate, that's my want." To those practical men I say *you*, you are the men I am looking to to receive the benefit of this great study.

The use of antiseptics and disinfectants will aid you not only to be more sure of your operations on the natural organs, but will place within your reach the means of securing the best results from artificial substitutes. Then let me more earnestly impress upon you the importance of the microscope in your every-day practice, let your relaxation from professional duties find pleasant occupation in striving to discover more perfect theories for the causes of diseases, and your efforts bear fruitage in the advancement of this most wonderful of all instruments, the microscope.

'Tis not my intention to lay out for you the plan you should pursue in carrying on this study, nor am I here to discourse on the merits and demerits of the many textbooks on this subject. Men in this, like all other fields of research, have ideas and theories of their own, and the one peculiar feature of this study is that *faith* is not the most essential qualifications for its progressive.

Let a man doubt every theory he reads till his own eyes and reason have compelled him to give assent to its truth or show its utter falsity.

To the young men of the profession let me say there is no field so wide in which to carve out name and fame; to the older members, weary with the strivings of a busy life, in no other line of intellectual development will you find so fascinating and pleasant occupation; and to those in the prime and vigor of manhood, it will prove a valuable ally in the good cause for which you are striving.

Excelsior then be the motto. Lift high the banner to the breeze, and as the moving army press onward and upward let each man make use of every aid to place his loved profession upon the pinnacle of fame.—*Transactions of the Illinois State Dental Society.*

## ARTICLE VIII.

A VISIT TO FOREIGN DENTAL SCHOOLS AND  
OTHER OBSERVATIONS.

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BY A. W. HARLAN, M. D., D. D. S., CHICAGO, ILL.

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France is so different from other foreign countries that a visitor usually spends most of his time in Paris. On previous occasions I had passed a few brief hours in other portions of the country, but most of my observations have been made during several visits to Paris, the home of many American dentists.

Away back in the "thirties" American dentists began to practice in Paris, and now there are few cities in France with a population of one hundred thousand and upward where they are not to be found. Indeed, I believe there are several Americans in cities even smaller than that. I do not know the exact number, but it is my belief that there are from thirty to fifty English speaking dentists located in Paris. Of all those which I have visited, Paris seems to be more favored in this respect than any other continental city. I presume that many are drawn thither by the reputation of the fabulous incomes of the few who have been long established in practice. For my own observations I believe that many of the practices are over-estimated in their net incomes received, as there are few, if any, that yield more than much as fifty thousand dollars per annum (250,000 francs).

When they take into account the cost of living in a foreign city—house rent, supplies, taxes, etc., entertainment of visitors, (like myself) and other expenses—probably there are not more than a dozen who can save above ten thousand dollars a year. The American dentist living in Paris is, of course, glad to see other Americans; but there are so many who visit Paris, that it must be very tiresome to see and entertain many who only come to visit, out-



curiosity, those who are so located. Besides, they take up valuable time; and he must be very methodical indeed who will insist on being seen only after office hours. I was very glad to be taught such a lesson once by a prominent dentist in Paris, who sent word to me that he could only be seen before nine in the morning and after four in the afternoon, unless I had business with him. This I have not forgotten. We could profit by such a method at home, it would enable us to accomplish much more in a day than can be done as things now are.

One Sunday morning I visited the Hospital and *Ecole dentaire* of Paris, and was shown about the clinic rooms by M. Ch. Godon and Dr. Levett, the professor of operative dentistry. This school is the oldest in Paris, and it confers a diploma (D. E. D. P.) after a three years' course of study. At present the quarters at 23 Rue Richer are so small, and I was told that very soon they would remove into a more commodious building. The students were at work, occupying all the available chairs, using gold and other materials, rubber dam, etc. Everything was clean and orderly, and I was very favorably impressed with the workings during that morning. The students are required to spend some time in working with metals, ivory, steel, etc., that they may acquire dexterity in handling instruments. This is an important item in the education of a dentist, and much to be commended.

The candidate for a diploma must be twenty-one years of age, have attended three courses of lectures, deposited his specimen case, submitted to a preliminary examination, unless he be a doctor of medicine, an *officier de sante*, or have a diploma as midwife, when he or she can enter the second year's course of the school. The dental college is not a stock-holder's property, but was founded by subscriptions, and aided by the city of Paris. I was told that they had about 150,000 francs toward a permanent building (which fund has been increased), and this they will shortly occupy. There are a number of distinguished medical



men and surgeons of Paris connected with the school, either as consultants, lecturers or professors. The school is in a flourishing condition, and had more than a hundred and twenty-five students last year. At present the diploma is not recognized by the State, as there is practically no law regulating dentistry in France. Any one may practice, I believe, by putting up a door-plate and announcing himself as a dentist. This is to be regretted, from the fact that medicine and surgery, and veterinary medicine also, are regulated by the Republic. In addition to the dental school and hospital, the Odontological Society of France meets in the college; also a dental benevolent society; and the faculty publish a journal—*L'Odontologie*—a monthly publication. This is a live journal, and I find something of interest in it every month. I have read it since its first issue, and I advise every one who reads French to do likewise, as it is only by comparison that we are able to finally judge of results. I wish the institution the support it justly deserves, and when again I visit France I hope to visit the new college building, and learn that the school has been endorsed by the State.

I was unable to visit the *Institut Odontotechnique*, which is the new school in Paris, but from a view of the outside I presume they have comfortable quarters; and a glance at the teaching corps will show that there are several well known names in the faculty, which is an assurance that they do good work. The new college publishes a journal also—the *Revue Odontologique*. *Le Progres Dentaire* and *L'Art Dentaire* are the only other dental journals of any consequence in Paris. My criticism of the dental journals would be that they contain too many translations of feeble efforts published in English or German, and too little original matter. Of late, however, they have been doing much better, and very soon I look for a still greater improvement on account of the increase of graduates from the dental schools.

France is the home of more original *brochures*, pam

phlets, and works on dentistry, than any other country in the world; and the professional activity is only just being awakened. I was told that there are several well-known French dentists who have more calls on their time than they can possibly attend to, and that the incomes of some exceed 100,000 francs per annum, which I am sure must be so. Until recent years the bane of French operative dentistry has been the use of amalgams and cements, and the lack of thoroughness in filling roots. Indeed, many French dentists never think of filling a root when a tooth is to be replanted or a crown is adjusted; and many destroy the pulp and leave it in the tooth, fill the cavity and bore a dent-hole.

Too little time is spent in the preparation of cavities, and old fillings, when inserted, are poorly done. These things will soon disappear as the new men enter the ranks and the old ones retire. The French are good artificers, and some of the most beautiful specimens of prosthetic dentistry that I have seen were made by French mechanical dentists. Too many French dentists use anæsthetics, and consequently many teeth are extracted that we at home would save. In the way of instruments and appliances they have as many as we, and all of ours too, to select from.

A thing that disgusts almost any dentist is to see the way in which some Americans, or people who call themselves such, mutilate the teeth of their countrymen or of any others who happen to fall into their clutches. What would we think of a dentist (?) at home who would solder a few teeth on a bar of platinum and then bore holes through living teeth, stick the ends of the bar through them, and cement this bridge with oxyphosphate, and call it permanent bridge-work? It is such operations as the above that bring reproach on American dentistry in Europe, as much as the bogus or unearned diplomas. The sooner they have a regulation of the practice of dental surgery in France, the better it will be for all concerned; then such Americans will be forced from practice, and all other foreigners, as well as natives. I have great faith in the sincerity of the French dentists, and believe that they will

work out the problem of conservative dentistry if they only have the moral support and encouragement of their confreres in other countries. The members of the two principal societies are doing good work; and, while they do not quite agree with each other in the proposed manner of regulating the practice of dentistry in France, or the method of instruction of dental students, still the good results will follow. The discussions in the two societies, while too much taken up with extraneous matters, are beginning, from the reports which have reached me in the two official journals, to take a more elevated tone. They are more serious, in fact, than they have ever been before.

The hospitality of the Frenchman is a thing which to me is incomparable. I had always been taught to believe that they were all selfish and without consideration for others, but I found the reverse to be true. Almost a stranger, and little known, I was everywhere treated with the utmost cordiality, and friendships were formed which I am sure will endure forever. I hope at some time in the future (perhaps when they will be assembled an International Dental Congress) to reciprocate the many courtesies and acts of friendship heaped upon me by my confreres in France, and expect to welcome a large number in Washington next September.

Americans are too prone to think that everything good and useful was invented or discovered at home; but if they would only read a little more, and travel with their eyes open, they would soon find that in many respects we have much to learn before perfection is attained, in art as well as in science; and a visit to France would be not the least enjoyable journey that an American dentist could undertake.—*Independent Practitioner*.

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#### ARTICLE IX.

### ARE THERE TOO MANY DENTISTS?

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This question is supposed to have been propounded originally by a dentist. Whoever he was, it is probable that his own answer to the question could be found

transposing the first two words of the query. Figures do not always express truth, but they are of some value. Divide the population of the United States in 1880 (50,000,000) by the whole number of dentists (15,000), and we have 3,333 as the proportion of patients to each dentist. Deduct from this number the paupers, the insane, the infants, and the average would probably be reduced at least one-half. If we consider further, the large proportion of visitants to dental offices who occupy time and attention without affording the dentist opportunity for a fee, another reduction from the average must be made. So much for the discouraging features of this question. Other statistics might be furnished of a more encouraging character. It seems that a multitude of dentists create a demand, instead of simply meeting it. This is more particularly the case than in the practice of medicine. Communities manage to live without dentists, which ought to support half a dozen. Facts may be supplied to prove that quality and not numbers in a community most affects the dentist's prosperity. In the East it is said that, despite close competition in prices, dentists, as a class, are prosperous. This holds good in towns and villages. From all that might be gathered, it would appear that there are not too many dentists, but there are too many who do not appreciate dental services. The further west we go the less evidence of prosperity we see among dentists, excepting in the money centres. There are many exceptions, but we are speaking now of the general average. Dentistry not infrequently goes hand in hand with some light trade, or merchandising, in states this side of the Mississippi, too. In view of these facts it is not strange that dentists everywhere look with longing eyes toward the cities. They expect there to find a class of appreciative patrons. Encouraged by promises of aid and influence from friends among the physicians, they crowd in and take their chances. After a time, perhaps, they become aware that even in cities a small proportion, comparatively, of all the population

seek the dentist's services. And that small proportion is already attached to the established dentists. The trans-Mississippi region is destined to furnish a fine field for the coming generations of dentists. The enormous influx of emigrants from abroad is, thus far, only the vanguard of the army which will cover the western plains during the next decade or two. From 1870 to 1880 Europe laid nearly 40,000 miles of railway, only 2,000 miles less than the United States constructed. This means increased facilities for poor emigrants to reach the sea-board. Steerage rates from Liverpool have been reduced to \$8.00. A few years ago it was \$35.00. It is estimated that with the opening of the 20th century we will have a foreign population of 43,000,000. Nine-tenths of these emigrants go west. They will cover the western plains, and hundreds of growing towns will assume the proportions of cities. The next twenty years, it is predicted, will constitute one of the most remarkable epochs in the world's history, as afforded by the spectacle of the unprecedented development of America's great West. These foreign elements will not only themselves, perhaps, directly afford encouragement to the coming dentists. But they will develop the country, and that will attract native emigration more than ever, and develop the cities and establish trade and manufacture. The question, Are there too many dentists, seems to be premature.—*Editorial in Cincinnati Medical and Dental Journal.*

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#### ARTICLE X.

### AN ARTIFICIAL CROWN.

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A. W. M'CANDLESS, D. D. S., DAVENPORT, IOWA.

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The crown I am about to describe is not altogether original with me, but as I have seen no notice of it in any of the journals, I will try to give an idea of the manner in which it is constructed.

An ordinary plain tooth—the kind used in rubber work is as good as a plate tooth and usually much more easily obtained—suitable for the case in hand is selected and fitted as accurately as may be to the root which has been previously prepared, care having been taken that the root is cut quite a little above the margin of the gum.

The tooth is then backed with platina which should be allowed to extend down below the incising edge of the tooth.

A copper wire 18 guage—platina is preferred—and about  $1\frac{1}{2}$  inches in length is laid with the centre over the pins of the tooth, bent down around the outside of the pins and up between them, thus forming a loop securely holding the pins. The ends of the wire are now twisted together forming a pivot of the very best shape for secure fastening to the root. Enough cement is used to simply catch the end of the pivot when the artificial crown is in place.

When the cement is sufficiently hard to hold the pivot firmly, fill the remainder of the root with amalgam which must also extend over the entire surface of the backing. Thus the metals all become thoroughly amalgamated into one solid mass, making a secure permanent operation, leaving no cement exposed to the fluids of the mouth, to become disintegrated.

I have put on many of these crowns where any other crown seemed impracticable and impossible on account of the poor condition of the roots.

I recently attached a cuspid crown of this kind to a bicuspid root that seemed almost worthless, as there was little left of it and the crown having been absent for so long that the lower bicuspid came almost to the gum surrounding the upper root.

The shape of the root can well be imagined being quite depressed in the centre so that it would be impossible to perfectly ferrule it, whereas the amalgam could be thoroughly adapted to it.

This being a first bicuspid and my patient a young



lady with otherwise pretty teeth, of course the adaptation of a perfectly natural looking crown in such a position was a gratification to both my patient and myself.

As I said before, I have placed many of these crowns on roots that seemed too far gone for any other good crown with which I am familiar and I have the first failure to hear from.—*Archives of Dentistry*.

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#### ARTICLE XI.

### CASES IN PRACTICE.

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BY I. P. WILSON, BURLINGTON, IOWA.

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CASE I.—Mrs. C., wife of a clergyman, came with her physician to consult me as to the possibility of diseased teeth causing the general debility and nasal catarrh from which she was suffering. The catarrhal symptom had existed for about twelve years; recently her general health was rapidly being impaired, and the catarrh greatly increased. Her breath was intolerably offensive, appetite gone, felt languid and despondent. I found the second left upper molar slightly discolored, but apparently in good condition. No sensitiveness on percussion, but the color of the tooth denoted a dead pulp. From a sense of heaviness in the left cheek, the catarrhal discharge from the left nostril, especially when lying on the right side. I diagnosed the case as one of disease of the antrum, the primary cause being found in the discolored tooth. I accordingly drilled into the pulp chamber and found it filled with putrescent matter confirming my diagnosis. The lady living at a distance I decided to extract the tooth, and was disappointed in not finding pus follow its removal. A probe was readily passed into the antrum and I found the floor thickly covered with a cheesy looking substance, resembling dried pus. Taking a rubber bulb syringe filled

with warm water, I thoroughly washed the cavity, the fluid readily passing out of the nose carrying with it large quantities of the purulent matter. I then used, thoroughly, a wash composed of a 5 per cent. solution of carbolic acid, and ordered the treatment continued. After her return home my directions were faithfully carried out by her physician, who reports her rapid return to health. Two months after this operation the husband called to see me, and reported his wife as being in the best of health.

CASE II.—Mrs. R., widow, æt. 30, called to have a tooth filled. Found her suffering from a nasal catarrh of sixteen years standing. Found second bicuspid and third molar on left side above slightly sensitive on percussion with indications of dead pulps; space between them occupied with artificial teeth on rubber plate. She had been under treatment (medically) in Chicago, New York and elsewhere without benefit. Health of late years gradually failing. Breath exceedingly offensive. It had never been suggested to her that diseased teeth might possibly be the cause of her ill-health, and she was loath to follow my advice. Finally she consented, and extracting the third molar I opened into the antrum. An injection of hot water was followed by a gush of corruption from the nose. The treatment of this case with injections of carbolic acid, sulphate of zinc, sulphate of hydrastis, peroxide of hydrogen, was continued for eight months, being used at various times. The discharge gradually subsided, and her health materially improved, when she left for a distant city. I should also state that the second bicuspid was afterwards extracted and found to be in the same condition as the third molar; root much enlarged from excementosis, and the pulp dead. The crowns of both teeth were sound. The tediousness of the treatment was doubtless due to necrosis of the spongy bones around the natural opening from the antrum into the middle meatus of the nose. These bones gradually softened and being disorganized little by little were washed away. The septum of the nose was also perforated, throwing the two passages into one.



It will be remembered that the roots of the superior molars not unfrequently penetrate the maxillary sinus, leaving nothing but the mucous membrane which lines that cavity to protect the apices of the roots. When an abscess forms under such circumstances the discharge will always be into the antrum, and the alveolo-dental membrane will frequently not suffer any serious disturbance, making diagnosis in such cases difficult.

CASE III.—Mrs. B., aet. 23, of robust health, called to have roots of first lower molar extracted. She expressed some doubts about the operation because of a "running sore" on her neck. On examination I found a fistulous opening over the clavicle near the place of origin of the platysma myoides muscle. I had no difficulty in tracing the sinus to the lower border of the jaw directly under the diseased roots. I extracted them and, without any further treatment, the discharge soon ceased, and abscess healed. The case was of eight years standing and had been pronounced by a counsel of physicians to be of a strumous character. Upon inquiry I found that this tooth had ached just before the swelling appeared on her neck, at which time it ceased aching, and subsequently the crown had broken off leaving the roots in the condition I found them. The facts in the case must have been simply these: The roots of the tooth were unusually long, and when an outlet was sought for the discharge of pus, the weakest point proved to be at the base, instead of the side of the jaw. When nature had secured an outlet through the bone, the pus gravitated down the fibres of the muscle, until it found an outlet at its origin.

CASE IV.—Mr. H., aet. 25, in good health called at my office with a friend. He informed me that he had given up a contemplated trip to his ranch in Texas on account of a malignant growth upon his face. The trouble had been pronounced cancerous, and he had been advised to submit to a surgical operation, as the only hope for his life. I found an irritable looking tumor about the size of a hazel

but immediately below the molar bone. There was no opening in it at the time, but he informed me that slight discharges took place at times. After using the lancet a probe was readily passed through the soft tissues and the alveolar process to the apex of the roots of the first molar. After extracting them and using the carbolic acid wash, I told him he need not hesitate taking his trip, as the cause being removed a rapid cure would result. He has since reported his entire recovery.

The above cases as well as others which have come under my observation, impress me the more that in many forms of obscure trouble about the head and face, the teeth as a probable cause should be carefully inspected—*Archives of Dentistry*.

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## THE FIRST DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

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Early in the coming January the above Society proposes to hold its nineteenth anniversary.

To those who have attended previous meetings, under the auspices of the First District it is hardly necessary to say that it will, in all probability, be a profitable and pleasant gathering. Every opportunity will be afforded those who attend to see and hear dentistry from a scientific stand-point.

We are creditably informed that the officers are now endeavoring to eclipse their former efforts.

For further information, see Journals for November and December.

## Editorial, Etc.

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DENTAL DEPARTMENT OF THE UNIVERSITY OF MARYLAND.—The class in this institution is as large at the time of writing as it was last year at the same period, notwithstanding the fact that no less than *five* new dental schools have been established during the present year. If the Association of Dental College Faculties would turn their attention to the matter of fees and insist that all colleges belonging to the Association charge uniform fees instead of the "cutting of rates," as it may be termed, which is now prevalent among a number of the lately organized schools, they would greatly benefit dental education.

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INDIRECT AND IMPROPER ADVERTISING.—The following remarks in the form of an editorial in the *Journal of the American Medical Association*, is applicable to dental as well as medical advertisements:

"We frequently receive from some of those who have advertisements in the advertising pages of *The Journal*, printed slips ingeniously calling attention to the value or peculiar quality of one or more of the articles they advertise, couched in such phraseology as to appear to have been written by the editor of *The Journal*, accompanied by a request to give such slips a place in the columns of *The Journal* for reading matter. We have uniformly refused to use such slips, and for the following reasons: 1. In making a contract with an advertising patron for a given space in the advertising columns and for a certain sum, there is no condition either expressed or implied that he shall have any additional space in any other columns not devoted to advertisements. 2. If we should accept such slips and place them in our reading columns as though they were expressions of our own opinion concerning this or that

—then they were actually only the interested expressions

of the manufacturers or advertisers themselves, we would be practicing a direct fraud upon our readers. This reason alone, is abundantly sufficient to deter us from yielding to any such use of our columns. Not a few enthusiastic manufacturers of medicines, formulas, foods, etc., appear to think we should actually test by clinical use every new thing, and every new combination of old things, they choose to send us, and express either by certificate or through the columns of *The Journal*, our most gratifying approval. It seems never to have entered into the thoughts of such parties, that such a task would require us to devote *all our time* to that work, and make *all* our patients subjects for *experimental* dosing, leaving us neither time to edit *The Journal* or even to tabulate the results of our heterogenous experiments on suffering humanity.

It is proper for physicians to use cautiously and judiciously such new remedies as may reasonably be presumed to possess valuable properties in the treatment of disease. But to obtain reliable results, such use must be extended through a large number of cases, the correct diagnosis of which has been assured; and only an actual clinical record of such cases becomes appropriate and desirable material for the reading columns of medical journals."

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## Obituary.

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D. M. PARKER, D. D. S.—Dr. D. M. Parker died on the 8th of October, at his residence, 132 Boylston street, Boston, of cerebral hæmorrhage, after an illness of ten days. Dr. Parker was born in Bedford, N. H., graduated in medicine when quite a young man, afterward studied dentistry in Nashua, went to Boston in 1845, and was for many years associated with the late D. Harwood, M. D., at No. 21 Summer street. For nearly twenty years he had been practicing on Boylston street, and was one of the first medical men to locate there. Dr. Parker

was an earnest advocate of a thorough medical education for all dentists. He was for two years president of the American Academy of Dental Science, was a member of the Suffolk District and Massachusetts Medical Societies, was also a member of the old New England Guards, and of many other philanthropic, scientific and social organizations. In 1863 he married the eldest daughter of the late Charles Bockus, an old-time Boston merchant. His widow and one sister, Mrs. Allan Wilson, of Nashua, N. H., are the sole survivors of his immediate family. A gentle nature, universally mourned.

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## Monthly Summary.

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**TROPHIC NERVES.**—The actual demonstration of the existence of trophic nerve fibres, apart from vaso-motor fibres has not until recently been made, although many evidences pointing to that conclusion have been put forward. Dr. Joseph, of Berlin, in a number of experiments on cats, produced facts which go to prove the existence of trophic nerve fibres in the peripheral nerves. The complication of vascular changes induced by the removal of the vaso-motor fibres from a part must be excluded in order to prove definitely that any nutritive changes occurring after section of its nerve are due to the loss of trophic influence. These conditions were carefully considered, and in order to avoid vaso-motor changes, the second cervical nerve was selected, which, as will be seen, contains no vaso-motor fibres. This nerve was used in all experiments. Mere section of the trunk of the nerve produced no effect, a reunion rapidly took place, so that it became necessary to remove a considerable portion of the trunk to prevent this occurrence. In some of the animals the ganglion on the posterior nerve root was also removed. The changes induced were limited to the area of distribution of the nerve, and in those where the ganglion was removed similar changes occurred in the

cutaneous area of distribution of the fifth cranial nerve of the corresponding side, coming on in different animals at a period varying from five to twenty-seven days. The changes consisted of loss of hair, at first localized, afterwards gradually extending, situated above and behind the ear where the trunk was only severed: above the eye and over the cheek, where part of the trunk and the ganglion on the posterior root were removed. After a time complete baldness and a shiny atrophied state of the skin made their appearance. No increased vascularity, inflammation or any other change whatsoever could be discovered in the skin. The hair was examined for parasites, but none could be found. Microscopic examination of the skin failed to detect anything beyond atrophy of the hair follicles; there was no evidence of inflammatory or other changes. From these experiments, Dr. Joseph concludes that trophic nerve fibres exists apart from vaso-motor fibres, and entirely independent of them; and he explains the similar changes in the area of distribution of the fifth cranial nerve by assuming that it derives its trophic supply from the ganglion on the posterior root of the second cervical nerve from which fibres join the ascending root of the fifth.—*Virchows Archive*, Bd. cvii., Hft. 1.—*The Practitioner*, July, 1887.

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DEATH DURING ETHER ANÆSTHESIA.—From our exchanges we have received accounts of a fatal case during the administration of ether. It occurred during the operation for hæmorrhoids in the person of a middle-aged man, under the care of Prof. D. Hayes Agnew, M. D., of Philadelphia. From the *Philadelphia Medical Times* of the 20th inst., we extract the following:

"The coroner's physician, Dr. Formad, made an autopsy, and discovered evidences of long-standing inflammatory and degenerative disease in the brain and medulla oblongata. The lungs were not engorged, but were collapsed. Death was probably due to the immediate shock of the operation or excessive apprehension. The lesions found were sufficient to cause death under any unusual excitement or emotion, but they do not correspond with the usual effects of ether when taken in a toxic dose."—*Southern Practitioner*.



**DEATH OF A LADY AFTER HAVING SEVENTEEN TEETH EXTRACTED.**—On Saturday, June 11th, Mrs. William E. Berry, of Santa, Hancock county, Georgia, had seventeen teeth extracted. She retired in the evening, feeling badly and during the night died. She was a young married woman. The death was unaccounted for. It is thought by some that the extraction of the teeth was the cause of her death. The operation was done by Dr. Buck, who travels from place to place extracting teeth without pain by use of a preparation called Electro-dentos. The anæsthesia is affected by applying the preparation to the beaks of the forceps. Dr. Buck is a practicing dentist, but devotes his time to extracting teeth, leaving rights to dentists. He claims that it relieves pain.

Now, as to whether the death of Mrs. Berry was caused by the effects of his preparation, or was simply produced by the shock, or some other condition of her system, is a matter of conjecture. We record the facts as they came to hand.—*Dental Luminary*.

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**EFFECTS OF STUDY ON THE TEETH.**—Among the hard-worked pupils of the Paris public schools, the teeth become deteriorated in a few months after entry. The second dentition is often premature. These observations confirm the statements of Dr. J. L. Williams, who has given great attention to this subject. He has shown that any mental strain shows itself upon the teeth in a short time, both in increased decay as well as in increased sensibility of dentine. Dr. D. M. Parker has reported that these same changes are always apparent in men who are training for athletic trials.—*Boston Medical Journal*.

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**A DENTIST'S BILL.**—Three teeth in the head of G. Onesti were operated upon recently by Dr. W. J. Younger, who sent in his bill for \$336 50, alleged to be due him as an aggregate for twenty-two hours and twenty minutes' work at \$15 a hour. Onesti refused to settle, claiming that he considered \$70 to be a reasonable charge. Suit was brought by the dentist, and the jury awarded the plaintiff the \$70 offered him at first.—*San Francisco Examiner*.

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VOL. XXI. THIRD SERIES—DECEMBER, 1887. No. 8.

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ARTICLE I.

SOUTHERN DENTAL ASSOCIATION, OLD POINT  
COMFORT, VA.—NINETEENTH ANNUAL  
SESSION.

REPORTED BY "MRS. M. W. J."

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The Southern Dental Association convened in its 19th annual session at the Hygeia Hotel, Old Point Comfort, Va., Tuesday, August 30th, 1887.

The President, Dr. W. W. H. Thackston, occupying the chair, the first day was opened with prayer by the Rev. O. E. Herrick.

Circumstances having prevented the attendance of Governor Lee, who had been announced to deliver the address of welcome, Dr. Thackston made a brief address, which was responded to by Dr. J. H. Prewitt, of Kentucky, in an eloquent address on behalf of the Southern Dental Association.

Dr. V. E. Turner next welcomed all present in behalf of the Virginia Dental Society. This was followed by the annual address of the President.



The Association was called to order at 3:30 p. m. After some announcements from the Committee on Arrangements, the President introduced Prof. J. Taft, of Cincinnati, President of the Section of Dental and Oral Surgery of the International Medical Congress. Dr. Taft was suffering from a severe cold and made only a few remarks, cordially inviting all dentists present to participate in the proceedings of the Congress.

The President next introduced Prof. W. H. Morgan, of Vanderbilt University, Tenn., as one of the few *confreres* of his early days.

After the response of Dr. Morgan, Dr. George H. Torney, United States Army Surgeon, of Fortress Monroe, was next introduced (the Association was indebted to Dr. Torney for a corps of soldiers from the Fort as subjects for the clinics).

A number of visiting dentists from abroad, and from the North and West were introduced, and to whom the privileges of the floor were tendered.

Dr. Tandlak E. Sjolberg, of Stockholm, responded in behalf of the foreign members present.

Prof. J. B. Hodgkin, of Baltimore, offered the following resolutions:

WHEREAS, this Association has learned with deep regret of the death of Dr. J. R. Walker, of New Orleans, one of its oldest and most active members.

*Resolved*, That a committee of three be appointed to draft suitable resolutions, expressive of the sense of the loss this Association has sustained, and present them at a suitable time for consideration.

*Resolved*, That a memorial page be set apart in the roll book of this Association, to be inscribed with the names of the deceased members.

The resolutions were adopted and a committee appointed, with Dr. J. B. Hodgkin chairman.

Dr. E. A. Baldwin (Chicago) having prepared a paper for the Association, by special invitation, was assigned to the opening of the morning session, Wednesday.

The committees of scientific sections not being ready with reports on papers, adjourned to 10 a. m., Wednesday, August 31st.

WEDNESDAY, AUGUST 31—SECOND DAY.

First session called to order at 10 a. m., the President in the chair.

Dr. A. E. Baldwin, of Chicago, by resolution of the previous session was invited to the platform as the guest of the Association, and read a paper entitled "Immediate Root Filling."

The President desired to thank the author for the very able paper he has presented,

Dr. B. H. Catching (Atlanta, Ga.,) wished to ask Dr. Baldwin why he used 95 per cent. carbolic acid in preference to five per cent.

Dr. Baldwin replied that it was used simply in a state of diluquessence, in which there was 5 per cent. water. The 95 per cent. was used to distinguish it from the solid crystals. He had understood there were other papers bearing on the same subject, and regretted that they had not been read, that the subject, rather than his paper, might be discussed.

Dr. W. H. Morgan (Nashville, Tenn.) moved that if there were any other papers on the subject, they be read.

Dr. Catching suggested that if there were any voluntary papers on the subject not in the hands of the committee they be produced at once.

Dr. Winkler begged that they come up "like little men," and read them.

Prof. J. B. Hodgkin (Baltimore) said that he would like to stay at Old Point Comfort till Christmas, but it could not be. He moved that the subject be passed if there was nothing further to be said.

Dr. Marshall (Little Rock, Ark.,) read a paper entitled "Conservatism in Selecting Filling Materials."

Dr. Winkler said that the paper read by Dr. Baldwin

was very valuable and its suggestions worthy of consideration, especially that relative to the thorough drying of the canal and the dessication of the tubuli. He did not agree with him in the use of the gutta-percha solution as root filling. He thought the best materials for root fillings were lead or carbolized wood, or gutta-percha points. He thought immediate root-filling limited to where the nerve was exposed and extirpated by driving in a wooden peg. In that case no treatment was needed, as all remains of the nerve and fibrous tissues would be immediately removed, the canal thoroughly cleaned and washed out, first with alcohol and then with carbolic acid, and wiped dry. When the canals were too small to admit the use of lead or wood, or gutta-percha points, he would use a mixture of iodoform and creosote in a stiff paste. Where dormant dead pulps were discovered, he cleaned the crown cavity thoroughly, opens the root canal and injects peroxide of hydrogen, letting it ooze out on a doylie until ebullition lessens and it finally comes out clear. Wiping it out thoroughly, fill with the iodoform and carbolic acid or creosote paste, pressing it down with a point of gutta-percha, but not sufficiently to force through the apex of the root. When old dead pulps were found, was afraid to fill immediately. Would dress them as above and wait at least one day. If they had been butchered with arsenic would wait longer.

Dr. J. C. Story (Dallas, Texas) said that to hear the brother from Chicago and the brother from Georgia talk, one might suppose that root canals were as big and as straight as gun barrels. But in Texas they were not made that way; they were crooked and small. That often it was impossible to get anything either in or out. He cleaned out root canals and he filled root canals as much as possible, but he did not fill them all. He uses oxychloride of zinc every time, and does not know that he has lost one. He uses iodoform because it outstinks all the odors of the tooth. He also uses oil of cloves and carbolic acid. If there is a blind abscess he *brings it to sight* by drilling

through the alveolar process, and fills at once. He said he wanted the brethren to tell him more about those drills that have sense enough to go around curves and stop right at the end of the root; they had never got to Texas. He also wanted to know the ethology of pyorrhœa alveolaris. He felt that those two items would pay him for his long trip from Texas.

Dr.——(name not given by speaker) said that he had thought much on the subject of absolute dryness; that all were agreed as to the necessity for asepticism, but he did not think absolute permanent dryness could be attained, even with the hot air syringe; that moisture would find its way in through the tubuli. by capillary attraction.

Dr. C. E. Kells, Jr., (New Orleans) said that if the root filling was perfect there would be no danger from moisture; that the two could not occupy the same place at the same time. He said that Dr. Baldwin did not claim to fill *all* roots, neither did he (Kells). If a root canal was so fine that a nerve bristle could not enter, there was not enough nerve fibre to fear. If a drill could enter, then it should be filled. He uses a carbolized wooden peg, driven to the apex, and Guillois' oxychloride, but anything that would seal the apex would answer the purpose. If a child of seven or eight years of age breaks a tooth, say by a fall, before the root is developed, a peg of orange wood can be so shaped as to seal the open foramen. For five years he had done as he was taught at college, treating for weeks, but he had long since abandoned that useless practice. If an abscess followed root-filling, it could be as readily treated from the outside. He said that Dr. Winkler had used the terms carbolic acid and creosote as though they were synonymous, but that was not true. Carbolic acid would cauterize and leave an eschar, which was not the case of creosote.

Dr. J. Rollo Knapp (New Orleans) said that he would admit that he had failures, and they came back to him with abscesses. He did not think wood would always answer

for a root filling; it would not do unless the canal was round. He would choose between wood or gold, or tin or gutta-percha points or pellets, or the solution of gutta-percha, according to the case. He also sometimes used oxychloride of zinc, or oxychloride and creosote—no one material was good in every case—sometimes he used the fluid gutta percha, and the solid to crowd it into the interstices. He used whatever he thought would be best and most effective for the case.

Dr. Winkler said he never used gold in root canals, but he admitted there were many that he would not fill at all.

Dr. Younger (of California) was introduced to the Association, and expressed his pleasure at meeting with "the Southern boys."

Dr. W. H. Morgan said that he had never listened to a better paper than the one read by Dr. Baldwin, but he must take issue with one or two points of minor importance. The trouble from lifeless teeth was the result of putrefaction—decomposition. If putrefaction could be prevented, it was immaterial whether or not the contents of the canals were removed. If thoroughly dessicated, decomposition could not take place, fluids being essential to the existence of germs. If the *cause* is removed we may safely trust to nature for the *cure*. If nature did not cure then we must resort to amputation, or trust to encysting. If the canals are enlarged so much as to remove a large portion of the dentinal tubuli with their semi-fluid contents, then there is less matter to decompose and putrify. This was his practice. If the contents of the tubuli could be dessicated by hot air, then a great stride in advance had been made. He was, however, still skeptical on that point, and would continue to rely on antiseptics, though he would give the hot air system a fair trial also. He objected to the pumping in of liquid gutta-percha as liable to be forced through the apex, creating irritation in the soft tissues. In case of decomposed pulp with abscess, he would cut off the

cause by thorough removal of contents and the use of disinfectants and antiseptics. It was stated incidentally that "the canals and tubuli were filled." He had never seen *tubuli* filled except by nature's own material, either normal or decomposed. Some fluid might possibly be forced in after thorough drying, but he had yet to see the *tubuli filled* by any process save nature's.

Dr. Baldwin thought he did not say *fill* the *tubuli*, but hermetically seal them.

Dr. Morgan said that sealing them at one end would not answer the purpose, since through anastomosis with the canaliculi of the cementum, fluids would still enter.

Dr. Geo. Eubank, (Birmingham, Ala.) to Dr. Morgan: Do you always devitalize exposed pulps, or do you endeavor to save them?

Dr. Morgan—I do not always destroy them.

Dr. T. Moore (Columbia, S. C.) did not think there were any drills that would go through all the contortions and contractions of some roots, but he did not deem it essential to fill all roots. He did not think the gutta-percha solution alone the best root filling, as from evaporation there would be some shrinkage and space left for other matter. After pumping in the liquid gutta-percha, he would drive in a point of gutta-percha, of lead, or of wood. In this way it could be filled so as to give no further trouble. He wished to ask Dr. Winkler if the process of driving out a nerve with the wooden peg was not very painful to the patient?

Dr. Winkler replied that until it was tried it was impossible to believe how entirely satisfactory this method was to both patient and operator, and how little sign of feeling was evinced by the patient.

Dr. W. H. Richards (Knoxville, Tenn.) referred to Dr. Baldwin's method of devitalizing and then waiting a week or ten days before making any attempt to remove the pulp. His own practice was to make the devitalizing application (arsenical paste) at say 8 a. m., and remove the pulp at 12



giving very little pain. At this period the congestion from the arsenic acted as an anæsthetic, and four hours after the application the nerve can be removed to the apex without pain. Later than that, inflammation sets in, and then suppuration if you wait a week or ten days. After removing the nerve the canals should be filled with a paste of 95 per cent. carbolic acid and iodoform for twenty-four hours, to prevent septic formations in the tubuli. He thought that if Dr. Morgan cut until he removed all the tubuli, he would have a very frail shell left. He did not see any necessity for drilling to the apex. He cleaned as best he could, but did not attempt to drill out; the small canals that could not be reached do not need filling. The little that is left in will do no harm if the door is so closed that no more can get in from the outside.

Dr. Tandlak E. Sjolberg (Stockholm, Sweden) said that the method of amputation of the pulp-bulb was much practiced in Europe. When the pulp was inflamed, (but not transformed to a shapeless mass) showing a new color not normal, if the root canals were very difficult, as in the mesial root of the inferior molar, they would cauterize with arsenical paste, letting this remain until next day; then opening the pulp cavity largely with a clean, sharp, new burr, they would remove the coronal portion of the pulp, really causing very little pain. Then clean out the pulp chamber thoroughly, checking the bleeding from the root, if any, by alum or what you choose. Place in the bottom of the cavity a small ball, the size of two or three pin heads of carbolic acid or oxide of zinc, adapting it to the walls and covering it with a cap of platinum. Fill over this with cement, and finish with amalgam. This requires only two sittings, and is used where the canals cannot be cleaned and filled. Perfect cleanliness of the instruments is very important in this method, using a new burr and dipping it in carbolic acid.

Dr. McKellops (St. Louis) said that this subject was worn almost threadbare, we had been at it so long, and still

there was the same want of success. No man could honestly say that he always makes a success. All who have ambition and pride try to do their work thoroughly. It is very well to say "devitalize the nerve and take it out." Sometimes it comes out very prettily with a few fibres of cotton on a broach; but again you may fuss for hours and defy any man to get it out. He said that he had hunted this country over and the Old world too, for the best broach; the finest made were the Swiss No. 10, but even with them he did not dare to go into all the buccal canals of molars. When does an abscess take place? What makes it form after we have done our very best, but not in so many other cases? He recently saw a patient in Chicago who had been treated for blind abscess. The teeth had been often filled. Finally the alveolar process had been taken off to reach it, and the septum taken out, \$175 being charged for the operation, and yet when he saw him his face was perfectly immense. Dr. Baldwin said that we were safe with one or two remedies, but materia medica is a big field, and chemistry acts a big part. It may be microbes, it may be chemical action; the question is still open, and students are at work on it. Men talk of their *successes*, but the abscessed roots that come to us for extraction with their oxychloride, and gutta-percha, and wooden pegs, etc., all in place, (some even filled with cotton, and smelling very sweetly!) tell another story than that of success. The man don't live who always makes a success of root filling. We sometimes think we had a success, when we learn afterwards that he went to some one else and had it out! These things come home to us all.

Dr. Beach (Clarksville, Tenn.)—Dr. Baldwin said in his paper that when he destroys a pulp he waits ten days for suppuration to take place. [A voice in the audience, "He said separation."]

Well! how will you have separation without suppuration? You will have decomposition of the entire pulp. My experience is that by waiting you have a little stump,



perhaps  $\frac{1}{4}$  or even 1-16 from the foramen that is more acutely sensitive than ever. I therefore use Dr. Winkler's method of stabbing with a peg of wood. It gives much less pain to the patient and is so promptly done. To wait ten days only increases the difficulty. I remove the day after making the application. Some one said there was nothing gained in drilling root canals. I think something is gained if the natural direction is followed and the canal rounded up; then you can fill with a round material smoothly rolled. I prefer a metallic filling to gutta-percha which, in contact with moisture, becomes offensive, as in the case with wood also if not infiltrated with carbolic acid. From an experience of seventeen years with it, I think lead is the best material. Even if it is driven through the apex it will be encysted, and not prove an irritant, so that you need not be afraid of it.

Dr. G. F. Evans (New York) said that he had an instrument for the application of dry heat in heating and drying dentine and root canals which he would exhibit at the clinics.

Dr. McKellops wished to recommend the gold broaches introduced by Dr. Herbst, made of platinum and gold, which if accidentally broken off could safely be left in as root filling, doing away with all dread of broken broaches.

Dr. Eubanks (Birmingham, Ala.) said that he found great advantages in drying root canals with alcohol, followed by chloroform, which acts well on the contents of the tubuli.

Dr. Stockton (New Jersey) said he was very glad he was not a young man coming to learn dentistry, for he should feel very much confused and puzzled, it was all so contradictory. One says dry out; another says you can't. One says drill them out; another says you can't because they are crooked, and another says shoot around the corners. The methods are as various as the men who advocate them. Many seem afraid to attack the pulp because

cause it may hurt the patient. There is not as much pain in knocking it out as in poisoning it to death; not as much pain in knocking it in the head promptly as in putting in arsenic, whether for four hours or for ten days. What do you do when you expose a pulp?

Take it out! Better to have it between your fingers, than leave it to give inevitable future trouble. Tell the patient it will hurt a little. They will anticipate so much worse than they realize that they will say, "Is that all? I thought you were going to take the nerve out!" But I don't believe in immediate permanent fillings; I would fill temporarily, so that it can be readily reached and removed if trouble ensues.

I hope our dental manufacturers will yet give us some means of compressing air in heated reservoirs. They would confer a great benefit.

Dr. Allport (Chicago) said he wished to thank the members of the Southern Dental Association for the cordial reception they had met, and he wished to thank Dr. Baldwin for his excellent paper; when he undertakes to write, he goes to the bottom of his subject.

In the treatment of pulpless teeth, we must take into consideration their anatomy and their surroundings and connections. A tooth is not isolated; it has its vital connection with the rest of the system, and before it can be treated intelligently these must be understood. A tooth receives its vitality through the pulp. The cementum is nourished through the peridentium, but anastomosis between the canaliculi and tubuli is but very slight. Any circulation after the pulp is dead must come through the apical foramen. A living pulp must be either treated or destroyed; the dentine requires but little treatment. If the contents of the tubuli are so placed that they cannot decompose, it makes but little difference what the canal is filled with. A diseased pulp should be taken out, for it will die of itself, or from medical treatment or by surgery.

Heat affords the best treatment for the tubuli, it

evaporates all the gases. A heated instrument is better than the hot air syringe—so hot that you can hear a sizzling sound. Then apply peroxide of hydrogen, expel anything that may have been left. Keep it up until no more gas is expelled then you can fill with safety. If the canal is thoroughly dried and purified, and the apex sealed it will be all right.

As the term, alveolar abscess is used, we would be led to believe that it came from gases evolved through the apex of the tooth within the alveolar. In nineteen cases out of twenty it is not an alveolar abscess at all; it is beyond the tooth, not around it. If gas escapes through the apex it follows the track of circulation. Where gas is formed within the tubuli of the tooth and pass through the cementum into the peridental membrane, we have an alveolar abscess, but this is not in one case out of a hundred. Gutta-percha, as a root filling, shrinks and becomes porous and offensive. Oxy-chloride of zinc has better chemical properties. Pump it in and then roll a little gold on a gold broach and force it gradually into the canal, coaxing it up and forcing the fluid laterally, finally withdrawing the broach but leaving the gold, leaving the root solidly filled to the apex. With this method I see no object in using wood.

Dr. McKellops said he was willing to go to Chicago only to see his young friend Allport get an instrument into a tooth hot enough to make it sizzle!

Dr. Allport said that the instrument was an instrument with a large bulb, to which was attached a broach. The bulb being heated very hot, the broach would convey sufficient heat to the chamber to make the contents almost boil, and would thoroughly dry the canals and all the dentine.

Dr. Morgan said that an identical instrument was used forty years ago to destroy nerves, burning them out with fire.

Dr. Beach moved that the subject close.

Dr. J. B. Hodgkin reminded Dr. Beach that Dr. Baldwin had the right to close the discussion by parliamentary procedure.

Dr. Beach withdrew his motion.

Dr. Baldwin thanked the Association for the completion of the lengthy discussion. He said that he always looked for more in the discussion than in the paper itself; that some of the speakers had failed to hear him, or had misunderstood his meaning. He had desired to state only his opinion, not an absolute certainty—man's work was never absolutely certain. We should never get too odd to turn, while the word of the youngest should be accorded the privilege of consideration. Some one said in the discussion, that he made it an invariable rule to devitalize, but judgment must be used! There can be no invariable rule used in anything.

In regard to waiting ten days, Dr. Baldwin said that he did so as a general rule, because the pulp was not a mass of nerve tissue only, but, also, of fibrous tissue, and would be found less painful, when the line of demarcation between the living and the dead was formed. He did not say "one or two", remedies were sufficient. He said, and meant, "a few."

Dr. Freeman (Nashville, Tenn.) said that many of the best men present had not been heard from, and many who had spoken, had said only that which had been heard time and time again. He hoped in future discussions they would speak and bring out what was new, pungent and to the point. The method for root fillings was one of the best things that could be used, and he hoped that those who had not yet used it would go home and try it, and report next year how they liked it, and if they don't like it, tell why. It will follow along a tortuous canal and will flatten out if the roots are not round. He had not used arsenic for seventeen years, avoiding the troubles which others have with it. There are some pulps so tenacious of life that for weeks and weeks they will persist in living in spite of gouging and

poisoning. Such nerves should be respected and allowed to live. If they want to die, let them die an easy, natural death, and then take them out.

Dr. Winkler—What do you use instead of arsenic?

Dr. Freeman—If I had a sick man I would not want to kill him! I want to cure him.

On motion the subject was passed and the Association adjourned to 3 p. m.

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The Association was called to order again at 3 p. m. when, after the election of several new members, the subject of Operative Dentistry was continued, and Dr. Stapleton of Sherman, Texas, read a paper entitled:

CAUSES OF FAILURES IN FILLINGS,

followed by a voluntary essay from Dr. T. H. Parramore of Hampton, Va., on

SEPTIC SPONGE.

Another from Dr. Geo. H. Winkler, Augusta, Ga.,

SOFT GOLD FOILS.

and one from Dr. J. B. Hodgkin, of the Baltimore College of Dental Surgery, on

AMALGAMS, AND METHODS OF USING.

The general subject of Operative Dentistry, and especially the points raised in the papers read, were discussed until the hour for adjournment.

Among those taking part were Drs. Carr, Morgan, McKellops, Storey, Beach, and the authors of the different papers.

Dr. Morgan thought the old amalgams, as Townsen's original, were better than any of their so-called "improved." They turned the teeth black, but they also preserved the teeth, probably from the chemical action of the copper contained in the old coins used.

He did not consider any filling material equal to gold, though decay was always due to leakage, no matter what

material was used. He also took issue with Dr. Stapler when he said that "dentists were born, not made." It was education that made the dentist. "Born dentists" were usually very poor specimens.

Dr. Storey came to the rescue of Texas, saying that the education in the world could not make a dentist of a man unless the Lord intended it; that is, unless he had a natural aptitude for it. To educate meant to *draw out*, and unless there was something of the dentist *in* a man, it could not be drawn *out*.

Dr. McKellops asked how about John Hunter, and other early dentists, who had no means of obtaining a dental education?

Dr. Morgan replied that he was not there when they were around, and could not answer for them.

In reply to Dr. Winkler's paper, he said that much could be done with cohesive gold that no man could do with soft foil, and the very fact that the profession had so generally abandoned the use of soft foil, was sufficient proof that it was not the best.

Dr. Storey was struck with the new operation suggested by Dr. Parramore. He had never succeeded in exposing nerves, but he would experiment on the new plan, even at the expense of his patients' feelings.

The discussion was lengthy and discursive, but something new was elicited, individual preferences *pro* and *con* being expressed at length, the usual theories propounded as to *why* gold was cohesive or non-cohesive, etc.; the general conclusion being, the best and wisest plan was to use either or both forms of gold, or amalgam, or cement, according to the nature of the case in hand, the health and age of the patient, the nature and location of the tooth and cavity, etc.

Professor Taft, president of the dental section of the Congress, addressed the members on the subject of the Congress, urging all to attend and participate in the proceedings.



At the close of the discussion adjourned to 8 p. m. Thursday, the day having been set aside for clinics.

Thursday, September 1st, was devoted to clinics, especially in operative dentistry and crown work.

Dr. Younger (San Francisco, Cal.) implanted an inferior central incisor for a soldier from Fortress Monroe. The tooth had been very loose and sore sometime before extraction with the fingers some months previous. Absorption was extensive, with apparently a very poor chance of drilling a new socket. The other central and the adjacent lateral had approached each other so much at the cutting edges that it was necessary to cut them away somewhat with a corundum disk to make space for the tooth to be implanted. The selected tooth having been sterilized and the root canal filled to the apex, the gum was dissected and the new socket formed with the triphine drills, the patient complaining less than is usually the case where a cavity is prepared for filling.

The other tooth implanted was a superior bicuspid. A flap of gum was dissected and turned back, to give access to the alveolus, and the socket drilled as before; the patient (a well-known dentist, Dr. Lester, of Virginia) stating that it was less painful than the preparation of a cavity for filling.

Dr. N. E. Baldwin illustrated the subject of his paper in a case of immediate root-filling; a devitalized superior second bicuspid, of which Dr. B. S. Byrnes (Memphis, Tenn.) subsequently filled an approximate compound crown cavity. Dr. Byrnes also filled, with soft foil in ribbons, a buccal cavity in an inferior left third molar, working under difficulties; having only one broken excavator to work with and using bibulous paper instead of rubber dam. Dr. Byrnes used, in these operations, the working model of his new automatic mallet, which can be readily attached to any hand piece by a simple attachment like putting a bit on, with a half-turn clamp. Every revolution of the engine gives a blow, a spring under the index finger controlling

the strength of the blow, or checking it altogether. The force of the blow is given by a hammer, instead of by a powerful spring, thereby avoiding the unpleasant effect of springing blow.

Dr. Wm. N. Morrison, of St. Louis, demonstrated his wonderful skill in filling tortuous roots with gold wire through a very small opening in the crown.

Dr. J. G. Morey proved the superior merits of his curve drills. These drills are in the shape of a triangular taper with a non-cutting point, with flexible shanks which conform to the curvatures of the roots. They are so constructed that there is no liability in using them of perforating either the nerve canal laterally, or the foramen. They are especially valuable in preparing root canals for the reception of pins in crowning or bridgework operations.

Dr. Morgan, of Staunton, Va., filled a labial cavity, demonstrating the advantages of Dr. D. B. Freeman's new doubleloop spring clamps, which hold the rubber dam in position over the tooth, crowd the gum back at the cervical border, and expose the cavity of decay in the centre of the labial loop.

Dr. Geo. Evans inserted one of his seamless gold concur crowns, made at the chair from an impression taken of the roots in Melotte's moldine; the crown made in a mold and burnished into form "a la Herbst." The crown was made and the roots prepared ready for cementing in twenty-five minutes.

Dr. Evans also exhibited his "bulb and broach" instruments for drying out all moisture from root canals and entinal tubuli, as recommended Dr. Baldwin in his paper on root filling. The instrument consists of a large, oval mass of silver, which, being heated in the flame of the alcohol lamp, retains the heat a long time, and readily transmits it through a broach to the tooth substance. Dr. Evans exhibited specimens of his removable bridgework, removable porcelain fronts of teeth for crown and bridgework, etc.

Dr. Genese, of Baltimore President of the Maryland



State Dental Society, gave clinics in prosthetic dentistry using his own articulator, upon which he modeled several cases consecutively. He made two complete upper dentures using his new pinless teeth; one with plain and the other with gum-sections. He also demonstrated his method of packing without any excess of rubber, using Richel's automatic vulcanizer. By his methods his rubber plates had a highly finished surface, requiring no finishing, and retain the natural contour of palate. Dr. Genese demonstrated the use of his "syphon tongue-holder," his "speculum and cheek distender."

Dr. L. P. Dotterer, of Charleston, S. C., restored a superior bicuspid with an all-gold crown made at the clinic.

Dr. H. A. Parr, of New York City, restored to its original appearance and usefulness, two central incisors which had been broken off by a ball seven years ago. The plate had been worn over the roots, which were badly decayed and buried under very unhealthy gums. The gums were dissected and pushed back, the roots cleaned, treated and filled to the apex. The roots were banded—one of them being split to the apex and porcelain front crowns with pins running up to the roots, cemented into the bands, the whole operation being completed in about two hours.

Dr. Parr also applied his "universal separators" in several different patients, in each case obtaining sufficient space for thorough examination, or operations in less than ten minutes.

The displays made by the dental manufacturing companies were very complete, not only in all the regular lines of goods, but in the number of new inventions and recent patents.

The S. S. White Company made their usual display of fine instruments, filling material, chairs, engines, and teeth of every style, shade and form, including their new "Bird's bridge teeth," having pins on the lateral surfaces for permanent attachment to adjoining teeth in the mouth.

Dr. N. T. Starr was busy striking up cap-crowns

air new die-plate and hub process, as described in the August *Cosmos*.

The "vulcan gold lining," for vulcanite plates, has the advantage of being cheaper than any metallic lining yet offered, costing only about eighty cents per full upper. This lining consists of gold and silver sweated together and rolled and hammered into foil of Nos. 20 and 40. The gold side is applied to the shellaced cast and burnished down. The silver being roughened by the sulphur of the rubber compound and adheres very tenaciously with no further preparation, aside from the usual mode of packing.

Among other things, in the S. S. White exhibit, may be mentioned the Mann vulcanizer; the battery, motor and switch-board of the Detroit Motor Co.; the Partz acidity battery, which offers the great advantage of not requiring to be emptied for several months at a time, the cells only needing to be cleaned twice or three times a year; the Shaw dental engine, an English patent, with a long upright standard and double-grooved pulley, and a complex driving spring, which gives five times the ordinary motion.

They have also an ingenious slip-joint connection with spring-cath for coupling hand pieces and right angles directly to dental engines.

In the Gideon Sibley exhibit was seen the Hood & Reynold's vulcanizer, William's separators, Brown's universal hand piece, and a fine assortment of teeth.

In the Welsh Dental Company's exhibit, the Richel self-packing, dry steam, automatic vulcanizer attracted much attention, and apparently possesses great merits. They exhibited a fine line of dental instruments and materials of all kinds, and are agents for Thompson's compound oxyhydrogen blow pipe, Dr. Genese's new pinless teeth, and other novelties.

They also had on sale the little book "Letters from a Mother to a Mother."

The American Dental Manufacturing Company exhi-

bited a number of new patterns of fine instruments, new filling materials.

Thursday having been devoted entirely to clinics, association was called to order again at 7 p. m., the president in the chair, when Dr. P. Beadles (Danville, Va.) presented a voluntary essay, entitled :

#### DENTISTRY: THE OLD AND THE NEW.

Dr. Winkler then desired to reply briefly to some points raised in the discussion of his paper on soft gold. Statements have been made which he thought were in contradiction to known facts, and he did not wish them to go forth in the reports of the association unchallenged. He did not believe that the fumes of ammonia would make gold non-cohesive. He had been obliged to burn sulphur in a barrel and use the fumes to improve a lot of "soft gold," when ammonia had failed to do what was claimed for it in that respect. Hope, the southern manufacturer of gold foils, had told him he added a small proportion of silver to make his gold non-cohesive.

(Quite a spirited exchange of *courtesies* here took place between Dr. McKellops and Dr. Winkler, regarding the clinic of the latter, which was subsequently seen as *à l'aimable*.)

Dr. Storey (Texas) said that when he wanted his gold *extra sticky* he passed it through tincture of iodine, and then through the flame, and it would stick like North Carolina rosin.

Dr. R. Finley Hunt (Washington, D. C.) hoped, in the interests of science and nomenclature, the term *soft* might be discarded, for cohesive and non-cohesive were equally soft, and the terms cohesive and non-cohesive were the only strictly correct terms to express the qualities intended to be conveyed.

Dr. Morgan thought that Dr. Beadles claimed more for the progress made in scientific dentistry than the facts warranted. Any one who would go back and read past

published as far back as 1850, in the old American Journal, could see that we had made but little advance except in modifying modes of practice.

On motion, the subject of operative dentistry was passed.

Mechanical dentistry being called, Dr. J. R. Knapp presented a paper by Dr. Hilzlim, (Mississippi,) which, on motion, was read by title:

MECHANICAL DENTISTRY,

left subject to the call of spoiration.

Dental Education called.

No paper presented.

Dental Hygiene being called next, Dr. W. D. Dunlap, (Alma, Ala.,) read a paper entitled:

DENTAL HYGIENE; A STUDY THAT BELONGS TO THE PEOPLE.

Dr. R. Finley Hunt (Washington) said that this was one of the most important subjects that could be brought to our attention. That this paper, like many others that had been read on the subject, while good and true as far as it goes, does not reach far enough. Dental Hygiene can be limited to one point—as in *Cleanliness* as specified in the paper, or to the preparation of the cereals as extended by Dr. John Allen, or to furnishing of abundance of limesalts to mothers and children, as held by our esteemed and lamented brother from New Orleans, Dr. J. Walker. The teeth may be kept as absolutely clean as possible—they may have had the most abundant supply of ingredients to make them, and to repair the waste of elements, and yet not be perfect health. It may be from lack of assimilation—or something else about the machine was not in proper condition—the teeth decayed in spite of every ease. Food-stuff in itself was not of so much importance as assimilation.

Examination of the skulls of our Northwestern Indians, of the Esquimaux and of the Sandwich Islanders,

before they had acquired the habits and vices of civilization proves their teeth to have been remarkably good, with well-developed arches. Yet their food varied widely—that of the Esquimaux being highly carbonaceous—oil, blubber, etc., that of the Indians, game and the cereals; of the Sandwich Islanders largely vegetable products—and yet the very different forms of food produced equally good teeth.

Dental Hygiene cannot be confined to the mouth alone; the whole system must be prepared for the reception, preparation and assimilation of food stuffs. He hoped that this would be made the subject of earnest study and investigation.

Dr. Beadles wished to ask Dr. Hunt if he would not include also the proper care of the mother during gestation?

Dr. Hunt replied that it was a matter of the greatest importance.

If there could be a return to natural conditions and habits of life our mothers would not need special prescriptions any more than did the Indians and Esquimaux mothers. The same plain food, well masticated, and fresh exercise in the open air and sunlight, and easy modes of dress, would induce a return to the type of well-developed arches and fine teeth found in our native tribes.

Dr. Wm. N. Morrison (St. Louis) said that much had devolved upon the dentist of the future in this line. The best work that we can do falls into ruins for want of proper care. We should instruct our patients how to care for their teeth. His experience had been very different from that of Dr. Hunt as to the results of thorough cleaning and care of the teeth. He believed that if a child were trained from infancy to keep the deciduous teeth well cleaned the second teeth would be all right. We have gone to extremes in the matter of prepared foods; we use too much acids and food that requires no mastication. If we were compelled to eat meat so tough that the jaws had to be assisted with the fists the teeth would be all the better for it. As we now live they are lost for want of use.



Dr. Storey said that in Texas they always had tough enamel, it was proverbial, and in Texas, too, the teeth were firm and strong as anywhere in the United States, except perhaps, Kentucky. In the "black-lands" of Texas, where there was a great deal of gypsum, there are heavy deposits of magnesia, lime and soda. The beautiful teeth spoken of do not decay, but they are surrounded by tartar and loosened till they can be lifted out with the fingers.

In other portions of Texas, where the environments are different, the teeth are beautiful in appearance, but the enamel is very thin and the body of the tooth soft.

Dr. W. H. Morgan liked the trend of the paper, but thought it extravagant as to the scholastic population, and thought the writer had better go over his figures again, even if "Uncle Sam" did get them up. He thought that in the study of Hygiene the object should be to attain the highest standard of health and the power to resist the encroachments of disease.

Dr. J. Y. Crawford (Nashville) said he did not wish to be regarded as fanatical, but he considered this subject one of the utmost importance to the profession, as a grand prophylaxy. The statistics quoted showed nineteen millions of school children; this alone shows the vast import of the subject. But a very small percentage have normal mouths, mouths in healthy condition, and fit to prepare food for the stomach. Dentistry is a grand prophylaxy, for by proper management of the teeth we ward off disease. If we could follow out the line indicated in the paper, with the enthusiasm of the writer, we would accomplish much for ourselves and much for the people. Our medical brethren smile derisively when we enlarge upon the importance of the care of the teeth, but it is none the less true that it is the most important hygienic question for the American people.

If our schools could be brought to require the same cleanliness of the teeth that they do of the face and hands, the same attention to the teeth that is demanded for the hair, we would get back to the perfect arches and the fine

teeth of the aborigines; but that would not imply going back to barbarism! The subject is one of vast importance, and far reaching in its influence, even to those yet unborn. We owe it to those coming after us to confer lasting benefits on the human family.

Dr. Hunt expressed his satisfaction at finding so able an advocate of his position.

When, with all possible care and cleanliness, teeth are nevertheless lost, it is from lack of assimilation. The Indians and the Esquimaux, who carried their perfect teeth to the grave, had no tooth washes, but their systems were in perfect order.

We cannot expect to produce very marked results in the present generation, but can work for the future. As we improve the mothers of the day we improve the children of the future. The question of heredity enters largely into this matter. Good food, exercise, fresh air, sunlight, proper modes of diet, does not by any means imply a return to the squallor of barbarism, as remarked by one speaker.

To bring the human system to perfection of assimilation is the highest point of that science which affects the condition of the human race.

*(To be continued.)*

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#### ARTICLE II.

### AMERICAN DENTAL SOCIETY OF EUROPE.

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ADDRESS BY THE PRESIDENT OF THE SECTION ON DENTAL  
EDUCATION:

GEORGE CUNNINGHAM,

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[Lecturer on Operative Dental Surgery at the National Dental College;  
Lecturer on Dental Surgery, approved by the Special Board of  
Medicine, University of Cambridge.]

GENTLEMEN:—Before proceeding to discuss the special subject with which this section is charged, permit me to

offer a few words of explanation as to the position I now occupy. I need scarcely say how much I value the compliment of being asked to preside over so important a section as that on dental education, a compliment which I did not accept without a great deal of hesitation and some considerable amount of pressure on the part of some of the pillars of this Society, and that mainly for two reasons. The first was, because of my temperament, which makes me rather incline to the *role* of a free lance in the field of discussion than to that of President, whose qualities should always be associated with calmness, impartiality and the weight of great experience. My second reason was perhaps the more important of the two, namely, the possibility of my being unable to be present at the meeting. I am sure, however, that in the opinion of this Society my excuse is of the best; if possible I hope at or about the time of this meeting to be in Washington, taking part in the International Medical Congress.

In order to make the communications and the discussions on the subject of dental education as practical as possible, let me first of all direct your attention to the international aspect of the question. No doubt the old adage, "Circumstances alter cases," in which we are, perhaps, apt to seek refuge when a point is made against our cherished institutions or our pet theories and ideas, will come into play. Now, while we admit the great force of modifying circumstances affecting our different countries, it cannot be gainsaid that there is an ideal education common to the whole dental profession, irrespective of country, irrespective of existing or non-existing institutions, and irrespective of our personal predilections.

The aim and object of our proceedings, however, must be no vain effort in search of a fugitive ideal, but an earnest endeavour to embody our highest aspirations in a practical utilitarian form to show what in our opinion constitutes the minimum course of dental education which, in the best interests of the public, we should demand from our dental students.



As life itself is characterised by the three several stages of childhood, youth and manhood, so I think we can observe three corresponding periods in the educational development of the dental practitioner. We must consider, firstly, the standard of Preliminary Education, which we may rightly require of everyone pretending to enter a liberal profession such as ours; secondly, that Professional Education, both medical and dental, which is necessary to qualification; and thirdly, that most fruitful but too often greatly neglected course of all—the period of Post-graduate study.

These three stages of our subject could only be efficiently treated by a longer discussion than circumstances permit; and as I have no doubt a practical unanimity will prevail amongst us as to the first and possibly as to the third stages here indicated, I shall ask you, as far as possible, to concentrate the discussion upon the second stage, which we will again subdivide for the purpose of facilitating debate.

With regard to the first division of the subject, it stands to reason that the dental profession, as such, will never occupy its proper position so long as it fails to exact from its students the same amount of ordinary school education as is demanded of those entering other liberal professions.

Both in England and in Germany, I think, it will be admitted that the certificate of the preliminary examination in arts in the one country, and the certificate of efficiency for the *prima* in the other, is all that may be required, and has the additional advantage of being identical with that demanded of the medical student.

I trust I am only expressing the opinion of all present when I say that the dental profession will only be satisfied by the same standard of preliminary education being demanded of the dental student as is required of the medical student; in this respect, at least, we must be content to take no subsidiary place, and if in certain countries, notably

America, no such evidence of preliminary education is demanded of the medical student, the dental profession of that country will only be honouring itself by insisting upon evidence of such an initial preparation from its students, and so setting a good example to their medical brethren. I can well remember being greatly struck by this initial but essential difference between the dental student in England and in America, so much so that when called upon to respond for England at a social gathering of the American Dental Association in Philadelphia, in the year 1876, I made that very subject the principal theme of my speech. In justice to the great common and free school institutions of that country, every dental and medical faculty should demand an examination in arts equivalent to those already mentioned. A preliminary examination in arts would do very much to enhance the appreciation of American diplomas abroad.

The provisions of the English law, so far as regards preliminary education, possess one great advantage over the similar provisions in Germany. Besides having one specially recognised examination, they publish a list of certificates or diplomas attainable in different parts of the world which are recognised as equivalents, and what is still more important, such a qualifying examination is always open to a man, no matter what his age or what his antecedents, thereby enabling him to make up for the possible deficiencies of his earlier education. Owing to lack of this early training in many otherwise well qualified men, it might be well if some temporary provision could be made for men of tried experience and mature years who are desirous of proceeding to a diploma. The examination, which is fairly easy to a lad fresh from his school studies, becomes an almost insurmountable barrier to the man of some age, even if he has had a good scholastic training in his youth. The cramming up of such studies for examination purposes must be of very equivocal value. In founding new regulations, some regard should be had for

these individuals, not merely in justice to them, but to prevent the loss to the profession of many valuable recruits.

Secondly: the professional education of the dental practitioner may be considered under two heads, that which is general or medical and that which is special or dental.

The consideration of the first of these divisions is, I think, one on which this Society should express no undecided opinion. The main question resolves itself into this: shall it be identical with that of the medical practitioner, or shall it be limited to a part only of the full medical curriculum? To many this question may seem scarcely worth discussion, from the general consensus of dental opinion in favour of the latter view; and so far as England indeed is concerned, after a long and vigorous contest on the part of the opposition, the question may be considered to be finally settled. It cannot be denied, however, that a number of the most earnest workers in dental research, and many of the best dental practitioners on the Continent, strongly maintain the necessity of the dental surgeon being fully qualified medically. With all sympathy for this noble ideal, I have a very strong conviction that the firm adherence to the medical curriculum as a *sine qua non* is a tremendous obstacle to the establishment and advancement of a reasonable and an efficient dental curriculum. This is notably so in the case of such countries as France, Austria and Hungary, where the barren discussion still goes on, while the special dental curriculum of England and of Germany is bearing a rich harvest.

The aphoristic statement that "the greatest good is that of the greatest number" should alone suffice to convince those who hold this lofty but narrow view on dental education. In these days, the urgent and almost universal demand for the services of the dental practitioner has called into existence an immense army of more or less unqualified men, especially where no special dental diploma

has been instituted. In the interests of the public, it is our duty to agitate for such an institution, and, when obtained, to maintain its honour and integrity with all our might. Considering the very exceptional and special nature of the necessary dental training for the efficient practice of what is, and must ever be, an important but yet minor branch of general surgery, it is manifestly absurd to contend that this specialty should only be practised by those who have expended about half as much again of the time and cost of study as is required of the major practitioner, in whose hands we are content to leave the very issues of life and death itself.

Though I have used the term minor as applied to our specialty, it must not be inferred that minor education or minor examination will satisfy our aspirations. The original memorial addressed to the Royal College of Surgeons of England, for the institution of the dental diploma in 1860, strikes the right note and is as true to-day as it ever was. "The memorialists do not suggest an education and examination inferior to that required of the medical practitioner, but proposes a certain advantage in kind only, not an advantage in degree—an education and examination especially adapted to the requirements of the dental surgeon as distinguished from that for the general surgeon." The two greatest authorities who have ever written on dental education strongly support the contention we are now making. The first is the present distinguished President of the Harvard University, who, in an admirable address, estimated the general medical subjects at three-fifths and the special at two-fifths of the whole education, rightly required after the aspiration to a dental diploma. The other, and not less distinguished authority, is that of Sir John Tomes. A careful perusal of his address on "The Study of Dental Surgery, and the means thereto," delivered at the International Congress of 1881, should be sufficient to convince all those earnest supporters of the cause of dental education who still maintain the necessity of a full

medical curriculum for the dental practitioner that in so doing they are wrong, and that by modifying their views in consonance with his, and by promulgating them, they will be rendering a service alike to themselves, to their profession and to their country.

If we decide, then, that the general or medical part of the curriculum required of the dental practitioner shall not be identical with that of the medical practitioner, we must carefully consider what subjects should be common to both curricula. So far as the consideration of this part of the subject is concerned, we cannot do better than consider the minimum requirements of the General Medical Council, England:

TABLE OF MEDICAL SUBJECTS FOR THE DENTAL DIPLOMA.

Anatomy	- -	One Course of Six Months.*
"	- -	Dissections—Nine Months.
Physiology	-	One Course of Lectures—Six Months.
Chemistry	- -	" " "
Practical Chemistry	"	" Three Months.
Surgery	- -	" Six Months.
Medicine	- -	" "
Materia Medica	"	" Three Months.
Practical Surgery and Clinical Lectures—Two Winter sessions of Six Months each.		

Anatomy, physiology and chemistry constitute the essential foundation of any medical education. Therefore, we fail to see why the general primary medical education and examination of the dental student should not be identical with that required of the medical student. It must be admitted that this further similarity as to the primary examination would do much to prove that the dental "curriculum" only differs by kind and not in degree from the medical, and consequently would do much to greatly im-

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\* The Royal College of Surgeons of England require a second course of Lectures on Anatomy, or a course of 20 Lectures on Head and Neck.

prove the position of our profession. Under existing conditions in England, such a step ought to be readily effected, as the class-attendance already required so nearly coincides with that of the medical student. In anatomy, for instance, the dental as compared with the medical student is relieved of only a part of one course of lectures and of three months' dissection. Again, the dental student is excused attendance on the thirty meetings of the practical physiology class. No such exemption should be allowed, as the remarkable advances made in physiology require a longer period of study than that at present allotted in the dental curriculum. The attendance on the lectures on chemistry and the three months' practical course is identical for both the dental and the medical student in England; but unfortunately the former is not examined on the subject, the natural result being that he too frequently neglects to make a proper study of the subject.

Examination in chemistry should form an essential part of the curriculum, unless indeed it becomes, as in some of our university curricula, a part, with biology and physics, of the preliminary scientific or first M. B. examination. The studies and examinations at Harvard University, so far as regards anatomy, physiology and general chemistry, are absolutely identical with that required from the medical student. I cannot help thinking that physiology does not receive the attention it merits at the examination board in England.

Those who are interested in ascertaining the place which physiology should rightly acquire, whether as a discipline or as practical useful knowledge, ought to read the able and eloquent address of Professor Michael Foster, delivered in Cambridge in 1880 before the British Medical Association.

One course of six months' lectures on surgery, on medicine, and three months on materia medica, also an attendance at a recognized general hospital, with clinical instruction of not less than one year, seem very reasonable

provisions to demand from the dental student. The lectures on forensic medicine, midwifery, pathology, practical pharmacy and vaccination required in the medical curriculum are not demanded from dental students, but are replaced by special dental studies.

The only amendment which we could propose would be the exclusion of pathology from this list of exempted subjects. Thanks mainly to the teachings of Cohnheim and other pathologists of the German school, the study of general pathology is now regarded rather from the view of disturbances and derangements in function, and also of perverted nutrition, than from that of purely morbid anatomy and histology. It must be evident, therefore, that a complete and practical study of the elements of general pathology, with its allied and included subject of bacteriology, is essential to a due and proper comprehension of the special pathology of the parts with which the dental practitioner has to deal. A course on this subject would certainly be more useful than, and might advantageously replace, the three months' course on general materia medica.

We must now consider what Sir John Tomes rightly terms the all-important special subjects comprised in a dental curriculum. This part of the subject divides itself into two main branches, viz., mechanical and operative dentistry, the latter term being used in its very widest sense.

So far as mechanical dentistry is concerned, the requirements of the English diploma are: first a certificate of attendance during a term of three years in the laboratory of a reputable dental practitioner; and, secondly, the attendance on two courses of lectures, on mechanical dentistry and the one course on dental metallurgy. In order that these lectures should have their full weight and importance with the dental student, they should be attended during his term of pupilage, and not, as is so frequently the case in England, after this period, when he has laid aside the

sculptor and the file, of which he is probably somewhat tired, for the excavator and the plugger, with which he is more enamoured.

As Sir John Tomes so wisely and beautifully expresses it, "It is one thing to know the scientific principles of an art, but it is quite another to carry them into effect. This requires an amount of skill of hand which can be attained only by long and careful practice under competent teachers. The fingers must become unconsciously obedient to the will; they must follow it automatically as the fingers of the skilled pianofortist execute the mental reading of the work he is playing, or as the hand of the sculptor produces the form the mind has conceived. Short of this unbidden obedience of hand, the performer would be but an amateur, and his professional life one long apology—a life of words in the stead of work."

From the possibility of such a certificate being more or less fraudulent, from the fact that the instructor may be incompetent or neglectful, but mainly from the cause that in many countries the profession is now a closed one, it becomes a serious question whether or not the teaching in this subject should not be conducted in a school under the open method, as is already the case in operative dentistry. Though we might not think it advisable to abolish the older system, which has much to recommend it, the establishment of an optional course in an open school might excite a tendency to greater efficiency on the part of private instructors.

The seven years' apprenticeship in the good old-fashioned English "workshop," with its advantages as a mechanical training, is gone forever. It would seem easy, however, to resuscitate something, if not all, of the skillfulness of the dental mechanic of the past by allowing a part of the period of pupilage to be spent in a course of instruction in practical mechanics in some school of technology. By the adoption of some such plan, the student in the laboratory would acquire a training not merely mechanical in name but in fact.



The consideration of that part of our subject which relates to operative dentistry need not detain us long. In the English schools, the lectures are confined to two courses on both dental-anatomy and physiology, and on dental surgery and pathology. With regard to dental anatomy, I can confidently say it would be difficult to find a better and more complete course than that which exists in either of the two London Dental Schools, embracing as it does a very thorough and complete study of comparative odontology, and following closely the lines laid down in Tomes' "Manual of Dental Anatomy." It is difficult to assume that the study of the student in this subject can be complete until some provision is made for his having a previously acquired knowledge of animal morphology, which already forms a part of an English university medical curriculum.

The syllabus, too, of the lectures on dental surgery and pathology is complete, thorough and exhaustive. The question, however, may well be raised, whether the dental profession should still be content with mere didactic teaching on those subjects. I think there can be no doubt that a very considerable, if not the major, part of the advance in medical science is greatly due to the enormously improved system of physiological teaching in which didactic teaching no longer suffices without a thorough and complete practical course of study in the shape of exercises in the physiological laboratory. If in this respect we can further identify the system of teaching those two fundamental departments of special knowledge with the practical system now adopted in the medical schools, we might safely expect to further raise the special dental scientific knowledge of our profession and thereby promote our greater efficiency as practitioners of the healing art.

Attendance is not required on any special series of lectures on operative dental surgery by any of the British licensing bodies. While admitting that no mere attendance on such a course will suffice to make the dental student an

efficient operator, I certainly think that a good course on this subject would do much to improve the dental student. In such a course it should be the aim to show the application of the many various methods and appliances now in use, to the various normal and abnormal conditions with which he has been familiarised by his training in the other courses of lectures. At the National Dental College of London such a course has been instituted for nine years, and I think the success which has attended the teaching of the two able lecturers who have held the post, namely, Dr. Finley Thompson and Dr. St. George Elliott, should stimulate the larger London Dental School to found a similar course of lectures.

The treatment of irregularities of teeth forms so important and essential a part of the dental practitioner's practice, that we do not think it receives adequate attention when it forms the subject of only a few lectures in the course of dental surgery and pathology. The appointment of a specialist in this subject to deliver a full and complete series of lectures and demonstrations on this subject would do much to raise the attainments of the profession in the treatment of this difficult part of our specialty. It is with deep sense of the advantages which I derived from such extra courses of lectures at the Harvard Dental School, including also one on dental materia medica and therapeutics, that I am prompted to suggest their adoption in our English schools.

With regard to the attendance at a recognized dental hospital, the provision of a full two years' course, as required by the British licensing bodies, is adequate. The teaching of the demonstrators is efficient and thorough, and as an evidence of the remarkable advance which the London schools have made in this respect, I cannot do better than refer to the evidence of one of your own Presidents, Dr. St. George Elliott, who said that, as an examiner, he had seen as good work in operative dentistry by English dental students as by the students of any American school

Thanks mainly to the exertions of the Dental Examiners at the Royal College of Surgeons of England, especially of Mr. Thomas Arnold Rogers, a practical examination forms an essential and important part of the ordeal necessary to obtain the English qualification. This part of the examination is conducted at one or other of the dental hospitals by the Dental Members of the Examining Board, who are in no way connected with the teaching department of the schools. A liberal supply of patients is provided, the student is required to explain fully the proper methods for the treatment of the mouths requiring operations, and is usually required to perform a more or less complicated gold filling. He must also give and discuss his opinion on the appropriate treatment of several cases of irregularity and other dental lesions. The examination mostly lasts about three hours, and from a recent personal experience, I can vouch for the extreme fairness, completeness and thoroughness of that part of the examination. The Deans of the London Dental Schools have advocated the addition of a practical examination in mechanical dentistry, a suggestion which commands approval.

With regard to the other part of the examination at the Royal College of Surgeons, England, it is conducted by papers and *viva voce* questions on anatomy and physiology, surgery and pathology, dental anatomy and surgery, and dental mechanics. The only improvements that we could suggest in this examination would be its division into two parts—the first for the purely medical, the other for the dental subjects. In this way it would seem possible to make some provision for examination in some of the subjects taught but not examined upon, such as chemistry, medicine, and materia medica.

The only other certificates required by the British licensing bodies to which allusion has not been made is that, first, of being twenty-one years of age; and, second, of having been engaged four years in professional studies, after passing the Preliminary Examination.

I think, from the information I have given with regard to the English diploma, you will be convinced that, while we may be of an opinion that it is capable of improvement and further development, it is the highest, most extensive and complete dental curriculum which exists. I think you will also admit that the four years required is none too much in which to do justice to such a curriculum, and indeed I know that a very large number of the students are unable to overtake it within that period of time.

In countries where a special dental diploma is a new institution, and the requirements pressing; it may be contended, with no little show of reason, that such a course is too long, too onerous and too expensive. It may be well, however, to remember that the English curriculum is the same as originally instituted in the year 1858, with the exception of the preliminary examination, which was wisely only made obligatory on students beginning their studies after the passing of the Dentists' Act of 1878. Of course, with the enormous advance in teaching, very considerable improvement has taken place in the development and practical results obtainable by such a standard or dental education. We cannot but think, therefore, that the nearer the various schools approximate the English standard the better it will be for the dental profession and the general public in all countries.

This is one excellent feature in the English scheme to which I must allude, and that is the formation and publication of a complete register of dental practitioners by the General Medical Council of Great Britain. A similar system of registration should form an essential part of the scheme wherever a dental diploma is instituted.

With regard to the third and final period of dental education, the period of post-graduate study has not, it seems to me, yet met with adequate recognition at the hands of those who have written, many of them so well and so ably, on dental education. The development of this part of the subject I must leave to a more fitting opport-

unity, and will merely indicate one or two points which merit attention.

The following out of the relatively small amount of extra study which would enable the dental practitioner to acquire a full medical and surgical diploma may be strongly recommended to those who are ambitious to take high places in the profession, and who have the time and the money to spare, as both will be profitably invested. It is also a question whether a further extension of special dental teaching might not be instituted for the benefit of those who would prefer to still further develop a scientific study of their specialty. Such courses, being instituted under the guidance of the best workers in the profession, might take the line of investigation and original research.

At Edinburgh University, a course of post-graduate study has been arranged for the benefit of medical practitioners, and in connection with it, I believe that the Edinburgh Dental School purposes instituting similar courses of study for dental practitioners already in practice.

Until the institution of some such course or courses as we have indicated, the young dental practitioner should early avail himself of the existing substitute by associating himself with dental as well as other scientific societies. He should not merely be content with the enjoyment of the social advantages to be derived from such institutions, but he should also make a serious study of the papers and discussions with a view of taking an early and intelligent part in the same. If in any way he can attach himself to a general or special hospital, whether in the capacity of dental surgeon or demonstrator, he will be doing much to promote his final and truly higher professional education.

From actual personal experience, I should also strongly recommend the young dental practitioner not to be too eager to rush into practice for himself, and provided the opportunity occur, he will do well to associate himself as assistant to some dental practitioner of repute and good

practice. Here he will find an opportunity of eradicating some of the minor shortcomings which seem incidental to hospital practice, and if not too bumptious and full of his own conceit, he will thereby secure an experience which is not to be measured by the amount of his emoluments.

One often hears a good deal against the Irish diploma granted *sine curriculo*. Let me call your attention to one good and excellent provision which the Irish College of Surgeons exacts from its graduates: "I shall not attract business by advertising or any other unbecoming practice, and I agree that such diploma shall be cancelled on its being proved that I have done so." \* Like many another evil thing, the advertising quack will be ever with us, but a united and well-directed effort should be made to restrain the graduates of all reputable dental schools from debasing their diploma, their school and their profession, by advertising and other disreputable and unprofessional means of attracting practice.

In conclusion, gentlemen, I apologize to you for the lengthy nature of this address, and I can only plead in extenuation the nature of the subject, which will no doubt meet with the exhaustive discussion its great importance merits.—*London Dental Record*.

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### ARTICLE III.

### SOFT GOLD FOIL.

GEO. H. WINKLER, M. D., D. D. S.

[Read before the Southern Dental Association at Old Point Comfort, Va., September 1st, 1887.]

In offering this essay on gold foil, I shall confine myself to a discussion of that form of foil which is rendered

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\* Something similar to this is agreed to by the Licentiates in Dental Surgery for the Edinburgh College and of the Faculty of Glasgow, but not by the College of Surgeons of England.

non-cohesive by the manufacturers, through methods unnecessary to relate, whose surfaces are deprived by various means of that inherent property of chemically pure gold, freshly annealed, of welding or cohering when pressed or malleted together, and known under the name of soft gold foil. I propose to elucidate as clearly and concisely as I possibly can my appreciation of the intrinsic value of soft gold foil in the preservation of teeth, the character of the operations in which its use is specially indicated, and my method of using it. In 1857 Dr. Robert Anther, of Baltimore, Md., published a treatise on what was then called adhesive foil. His views and ideas expressed in that paper met with considerable opposition from the profession at large, and it was a number of years before cohesive foil came into general use; and up to that time soft foil was the only gold inserted in teeth.

The older members of our profession are well aware of the fact that teeth were well preserved then as they are now by its use. I, myself, have seen fillings of soft gold foil inserted in the mouths of patients in Charleston, S. C., by Drs. Brewster, Houston, Manifestdt, and my father-in-law, Dr. J. B. Patrick, that were still preserving the teeth after a duration of 30 to 40 years. Some of the fillings were so soft that an excavator could be readily pressed through them, and yet the cavities they occupied were entirely free from decay.

In a practice extending over nineteen years I have been in the habit of using soft gold foil, cohesive foil and a combination of the two, selecting that kind which, in my judgment, seemed best adapted to each case presented, and I am satisfied there is no gold so entirely satisfactory as soft gold foil, both to operator and patient, in cavities where I use it. It preserves the teeth at least as lastingly as any other gold; it is always used honestly for the preservation of teeth, and never for show; it can be inserted with the greatest ease; it can be introduced rapidly—so rapidly in fact that a suitably prepared cavity can be tho-

oughly plugged with soft foil in from five to ten minutes that would require nearly or quite one hour to fill with cohesive gold; it is the most expeditious method of plugging with gold known to human skill; it is readily adapted to the walls of the cavity; it makes, when properly condensed, a filling sufficiently compact and hard for any service that may be required of it; it expands laterally under pressure exerted on the surface of a filling when condensing, thus rendering more certain the hermetic sealing of the cavity; the process of its insertion in a cavity places always a comparatively thick pad of gold against the wall from which the cavity is filled and between it and the instrument thus protecting that wall from being bruised or crumbled by the tempered steel. This condition alone makes it extremely valuable at the cervical walls of approximal cavities of all teeth, and most decidedly so in those of soft texture. Soft foil can be successfully introduced into cavities difficult of access without a sacrifice of sound tooth structure; it enables an operator to economize greatly in time and labor, and protects his patients from fatigue and in many operations from utter exhaustion. On this account it is especially grateful to frail persons or little children. It does away with the necessity of using the rubber dam, which is objectionable to many; it can be filled and finished with great facility and with absolute certainty, especially at the cervical margins of approximal cavities; no overhanging edges of gold are ever left at these points in soft foil fillings. The habitual use of it induces the highest appreciation of the great value and genuine merit of cohesive foil in operations requiring the use of the latter; the proper and successful handling of it seems to affect and develop manual dexterity, for nearly all soft foil operators are skillful manipulators of cohesive gold. The reason for this excellence is apparent, for soft foil operators depend entirely for success in their work upon the mechanical principles of mortising and dovetailing and their mechanical ingenuity is thus constantly exercised and



trained, and they bring this skill of mind and hand to bear upon their cohesive foil operation. For the foregoing reasons I believe soft foil to be unquestionably the very best preparation of gold for filling the following cavities in teeth: All simple cavities—by which term I mean those cavities whose walls are intact, situated upon the grinding, buccal, palatal or labial surfaces of teeth, excepting always such as are extremely small or as are in the form of narrow fissures (I fill these with cohesive foil;) cavities occurring at or under the free margin of the gums—these cavities can be filled and condensed so rapidly that the mucus secretion has not time to dampen the filling, the first pellet or two sometimes actually acting as a compress on the gum, effectually protecting the balance of the filling during insertion from its secretion; simple approximal cavities, rendered accessible through separators, wedges or cutting instruments, and not requiring to be knuckled up; approximal cavities of bicuspid or molars when the crown of the tooth is involved by having crushed through to the decay beyond or by having been cut out by the operator, the buccal and palatal walls of the tooth remaining intact. In such cavities as these, which are partly contour, the approximal portion of the cavities should be filled from the cervical wall for at least two-thirds of their extent with soft foil the contoured portion and crown of the filling should be of cohesive gold welded to the already well-condensed soft, and made more secure still, if necessary, by suitable undercuts. Crown and buccal cavities, or crown and palatal cavities, connected by a narrow fissure, should be filled in the crown and buccal or crown and palatal with soft foil, and the fissure should be built up with cohesive foil welded to each of the two fillings, and in such cases rendered more secure by proper undercuts.

In fact, I seldom fail even in contour work to begin each filling with one or more pellets of soft foil. The certainty with which cohesive gold can be welded to soft by applying small pieces of the former, fresh from the lamp, to the latter, and the remarkable strength of the union, is an incredible fact to those who have never used or seen the combination.

I now come to the method of insertion and condensation. Soft foil is used in the form of ropes, ribbons, cylinders and pellets. I prefer the pellets, and use them almost exclusively, for the reason that they are easy to make and convenient to fold into the cavity ; they are readily guided into their position, and there is nothing about them which interferes with an unobtrusive view of the work in hand ; and then, I think a pellet can be condensed into a more compact mass than either a rope, ribbon or cylinder. In preparing my pellets I take a small piece of foil torn from the leaf larger or smaller, according to the size of the cavity to be filled, and fold it upon itself lightly, first in one direction and then crosswise, until I have a small, loosely-folded mat which I crumple together and roll between my fingers and thumb into an oblong pellet, having one end more pointed than the other. The pointed end serves to guide the pellet to its place when being inserted, and the crumpling of it forms on its every fold innumerable minute wrinkles, some salient, others reentrant, which under pressure interdigitate so thoroughly that the finished plug is held together with the tenacity almost of a solid mass. This result is accomplished by the interdigitations of the salient and reentrant angles of the crumpled pellet. The interdigitation of the crystals of the foil is, in my opinion, a myth, because I have proved to my own satisfaction that a sheet of foil folded upon itself to a strip, and that strip rolled upon itself into a cylinder, and then compressed between pluggers into a hard mat, although full of crystals, is capable of being carefully unfolded into foil again ; but if a similar sheet of foil be crumpled and rolled into a pellet and then compressed, there is no amount of skill or care that can ever unfold it again. The preparation of my cavity is not dissimilar to the usual form, except that I depend almost entirely upon undercuts, having, of course, two opposite each other, and seldom resort to retaining pits. I insert the first pellet of gold against the cervical wall in approximal cavities, and against the distal wall in nearly all others, allowing part of it to lie along the bottom of the cavity like a foot piece, and condensing it all with my plugging instruments, so that it shall conform in shape to the undercut wall against which it is placed a small portion of it left protruding from the cavity to form a

surplus ; then remaining pellets are then inserted and condensed as before, each preserving as nearly as possible the general conformation of the first until the last piece is crowded to its place against the side of the cavity nearest or most convenient to me. The last pellet of gold should be inserted always at the side or edge of the cavity, The gold slips or glides over the edge of the cavity more perfectly than over a surface of partly condensed gold, such as is found where an excavator is driven into a filling and pressed laterally to make room for more gold. The gold is thus laterally dovetailed into the cavity. The surplus is now pressed together in the form of a cone, and the whole mass is then still further condensed. Some of the instruments used for folding the foil into a cavity have smooth or very slightly serrated points : others have deep serrations, while others still are so sharp as to be denominated needle points. I prefer the smooth, and exercise the greatest care to avoid punching my instruments through the foil. Every puncture made by deeply serrated or needle pointed instruments through soft gold foil in folding it into the cavity assists in diminishing the integrity of the filling, and even the habit of pressing an excavator into a partly condensed filling in order to make room for more gold to be inserted, as is done by some operators, is false in principle and frequently unsuccessful in practice. If a cavity is found to be not full enough, the gold in it should be thoroughly condensed and cohesive foil welded on to complete the filling. In folding and condensing the foil into a tooth, I use hand pressure, automatic mallets and the lead mallets ; in finally condensing the filling, I use heavy instruments of various shapes (which it would be unprofitable to describe here) for hand pressure, and a few suitably formed instruments with the lead mallet, but I depend principally upon plugging forceps for condensing the gold in buccal, palatal, labial and approximal cavities, and in some cases the fillings upon the crowns of low molars. These forceps are adapted to the various positions of the plugs they are intended to condense. The last mentioned, those for condensing crown cavities in lower molars, being so formed that one beak of them bears on the back of a pad placed outside of the mouth under the jaw and beneath the tooth operated upon, while the other beak

forms a condensing point and is pressed upon the gold in the tooth. I use these forceps with great satisfaction upon little children and very timid persons. I have another instrument for condensing the gold in crown cavities, which I call a biting instrument—to a heavy handle is fitted a steel disk, on one side of which is soldered a pad of block tin; to the other is screwed a steel plugging point. The point is placed upon the gold and moved on it from place to place, the patient biting upon the tin pad above and below, as the case might be, each time the instrument is moved, until the entire plug is thoroughly condensed under the powerful pressure of the muscles of the jaw.

By carefully noting the above explanation of my method of filling with soft foil, it will be observed that having a cavity properly prepared for plugging, I am governed in the prosecution of my work by three rules or laws, which I regard as absolutely essential to an exhibition of that high excellence of attainment possible, and that should be secured in soft foil operations. First, each pellet of foil is so folded into the cavity the completed mass forms a perfect dovetailed mortise, and depends entirely upon the mechanical principle of dovetailing for its retention in the cavity. Second, each pellet of foil, as well as the entire mass, is most carefully guarded from being punctured or torn by the instruments, in order that the strongest integrity of the gold remain at its maximum; and third, a final, complete and powerful condensation of the filling, by means of instruments ingeniously adapted to their work and made according to those laws of mechanism, which afford readily, absolutely and safely, the important power needed. The filing off and polishing of soft foil fillings is similar to the finishing of other plugs.

I use, in my practice, Nos. 3, 5 and 6 gold foil, because they seem most perfectly to combine that thickness which gives strength with that pliability which ensures successful manipulation; and I am extremely careful in selecting my foil to avoid those makes which are apparently weak or rotten in their texture.

I expect that some of the statements in my paper will be received with scepticism by operators who do not use soft gold

foil, but I am perfectly aware that there is not a single statement contained in it which is not capable of the clearest proof by actual demonstration.

The manipulation of soft gold foil is a beautiful art in itself, entirely distinct and different from that art which is invoked in cohesive foil operations. I think every operator should perfect himself in both arts, and every one who fails to do so deprives himself of many superior advantages in operating, that he would otherwise enjoy, and withholds from his patients, in many cases, great relief from fatigue.—*Southern Dental Journal*.

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## Editorial, Etc.

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THE following letter, from the London *Dental Record*, gives the experience of an English dentist who had two teeth implanted by Dr. Younger at a clinic held in Washington, D. C., during the session of the International Medical Congress.

PENZANCE, October 26th, 1887.

DEAR CUNNINGHAM.—In reply to your enquiry *in re* notes on my implantation case, I send you the two teeth used, and I shall be glad if you will have them examined under a microscope, and let me know if there is any pericemental membrane on them or not. They are, as you see, the right and left superior laterals, but whence they came, and to whom they belonged, I cannot say. I believe they were picked out from a lot of extracted teeth at some dentist's in Washington. Nearly all who spoke to me as to the operation were curious to know the severity as regards pain. My answer has been that it is quite as bad as having a tooth out. After the first incision the detaching of the periosteum, before drilling the hole, is the most painful. The drilling and burring out of the socket is, however, bad enough, and got worse as it neared

the end. In my case, however, I think it was worse than usual, the whole of the outer, or labial, plate of the socket for the right lateral, was cut away; and the instrument finally passed through the gum on the labial surface, which was afterwards held together by a stitch of silk thread. The left lateral had a very thin plate of bone on its labial surface, but the trouble with this tooth was that it was a very thick one, as you can see by looking at it, so that it came in the way of the bite. Dr. Younger tried to correct this by grinding off the cutting edges of the lower laterals, but he did not take off enough to do any good; the consequence was that after five or six days' use the silk ligatures had slackened a little, the teeth got very loose and moved with the least possible force—such as suction in drinking, &c. The right lateral could also with very slight pressure be pushed up into the gum an eighth of an inch too far, the root pressing the gum outwards before it. The left lateral was also being constantly interfered with by the lower teeth; also the hurry sometimes in travelling prevented my taking as much care of them as I might have done at home. In fact, there ought to have been a platinum plate struck up to fit the palatal surfaces of the whole of the front teeth, with the platinum passing up over the cutting edges of the two implanted teeth, so as to protect them and to keep them steadily in their place. I got my cousin, a dentist in Ottawa, in Canada, to tie the teeth with fresh ligatures, but they got so loose and uncomfortable that I concluded that it was useless to persevere any longer; but I will try the operation again at home when I can get two fresh good teeth and can give proper attention to taking care of them afterwards. In my case Dr. Younger worked very hurriedly, taking about six minutes in inserting the left lateral, reckoning from the first incision to the tooth being placed *in situ*. I felt that I could have stood the pain better if a longer time was taken, but he wished to operate against time and astonish the natives. I think he made a mistake in not leaving a plate of bone on the labial surface of the right socket by drilling the hole more towards the palate. This might perhaps have interfered with the tooth taking its place in the arch properly; in which case I think it would be better to place an artificial tooth upon a natural root at the

proper angle. I should have been glad if cocaine had been tried in drilling one of the sockets, so as to note the difference in the pain, but the whole operation was done hurriedly, and proper care was not taken afterwards, which no doubt accounts for its failure.—Yours sincerely,

J. H. GARTRELL.

EXAMINATION QUESTIONS.—*Royal College of Surgeons of England.*—The following written questions were given at the Examination held on October 31st.

#### ANATOMY AND PHYSIOLOGY.

1. Describe the Muciparous Glands lying beneath the front part of the Tongue. Adduce the grounds on which they have been regarded as the seat of Ranula.
2. Describe the hard and soft Palate, the action of their muscles, with the nerve- and blood supply, and give their bearings upon the Surgery of the Palate.

#### SURGERY AND PATHOLOGY.

3. Give the causes and treatment of Bleeding from the Gums and Jaws.
4. Give the signs and treatment of a Foreign body impacted in the Rima Glottidis.

#### DENTAL ANATOMY AND PHYSIOLOGY.

1. Describe the dentition and the rostrum of a Saw-Fish. What light is thrown upon the homologies of teeth in general by the teeth of Sharks and Rays?
2. Describe briefly the growth of the Lower Jaw before and after its union at the symphysis. How has its method of growth been traced?
3. Describe minutely the relations of the Upper to the Lower row of Teeth when closed, and point out the advantages of such an arrangement?

#### DENTAL SURGERY AND PATHOLOGY.

1. What influences are known to injuriously affect Teeth during their development, and how are they subsequently manifested?
2. Give the causes of Alveolar Periostitis. Describe its varieties, treatment, and terminations.
3. What are the difficulties to be encountered in rendering Stoppings water-tight? How are these to be combated in the application of the several filling-materials in ordinary use.—*Dental Record.*

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ARTICLE I.

SOUTHERN DENTAL ASSOCIATION, OLD POINT  
COMFORT, VA.—NINETEENTH ANNUAL  
SESSION.

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REPORTED BY "MRS. M. W. J."

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Dr. J. B. Hodgkin said that without statistics or rhetoric, he had observed that constitutions were laid out on certain lines. His father, at 82, had perfect teeth, and yet he used no tooth wash, and had a holy horror of dentists.

One man has a long nose and short legs, another has a turned up nose and very long legs; one has light, straight hair, another has dark, curly hair; when the lines were laid down that made him that way he got the tread or type, not only of his legs, and his hair, but also of his eyes, and his teeth. When were those lines laid down? Some one asks, "when shall I begin to educate my child?" It was begun two hundred years ago! A mother brings her child to me:



to examine her teeth: I can only say to her. "I will do the best I can for her; but she will yet wear artificial teeth." When the lines of the constitution were laid down, the teeth got a certain stamp, and, and you cannot stamp it out.

(Repeated cries for Atkinson! Atkinson!)

Dr. W. H. Atkinson took the stand saying: "There must have been many stamps at work in the molecular construction of that call for Atkinson!" He said that he had warm words of greeting for his brethren in the South, whom he loved because they loved the truth, and manifested such earnest wishes to attain to it.

The forces that move men, and stamp out their career, were at work before there were any inhabitants on this planet. These forces were transmitted down through the ages, from the mother to the child, through the ministration of the male parent.

In the discussions, he had been pained to see how many propositions had been started on mere assumptions, without any solid ground or foundation, except that of "stamps," and even that was not defined so that one could get hold of it clearly. A knowledge of embryology is essential to the understanding of the question involved. Each one should walk in obedience to his own highest conception of truth, taking the step that the light within him shows it to be the proper step for him to take. Words fresh from hearts warmed and illuminated with divine truth are better than memorized trash in books; but don't take away the gods of the past till you have something better to put in their places. What is the use of the teeth? to comminute food; the babe has no teeth because the nutriment in milk has been comminuted and it holds stored radiance. With our present habits of civilization we have but little real need of teeth, our food is so prepared for us. When the natural mode of feeding was in vogue the food kept the teeth in order. The highest duty of the professional man is to so teach the subject he deals with that he shall no longer need his ministrations. We should not fear to trust the inspiration of the

Almighty that giveth us understanding, but should live constantly in the illumination that comes from without.

Dr. Freidrichs (New Orleans) thought that though the original stamp or tread might be about the same in two individuals—whether of the human race or seeds of plants—we had the power of control over their development into mere different finalities; of the two human beings, one might be starved and neglected, the other well fed, sheltered and nursed; of the two seeds, one might be planted in rich soil and have no care, the other planted in rich soil and have every attention; the results would be very different in each case, notwithstanding the original stamp or trend.

Dr. A. W. Harlan (Chicago) being introduced, stated that at the meeting of the American Dental Association, a committee had been appointed to confer with a similar committee from the Southern Association with reference to the acceptance by the latter of an invitation to hold the next annual meeting of the two Associations in joint session. He therefore asked the appointment of such a committee that the conference might be held.

Dr. J. Rollo Knapp (New Orleans) made the motion and asked that a committee of five be at once appointed by the President.

Dr. W. H. Richards (Knoxville, Tenn.) moved to amend and postpone the appointment until a more convenient hour, as it was then nearing midnight.

A motion made to adjourn was negatived.

The President said he would have preferred time for consideration, that he might make a judicious appointment, but under the stress of circumstances, he yielded, and named Dr's J. R. Knapp, E. S. Chisholm, Winkler and Storey; Dr's. Harlan, Waters, McElhaney, Shepherd and Wardlow being the Committee from the American Association.

Adjourned.

FRIDAY, SEPTEMBER 2ND.

Called to order 10:30 a. m. The President in the chair.

A telegram was read from the President of the American Dental Association, congratulating the Southern Association in its successful meeting, and expressing regrets at inability to be present, owing to illness of his wife.

Prof. Hubbard, of the Mehary College was introduced, who addressed the Association on the subject of his college for colored youths, and the gratifying progress made during the past year in the dental department.

Prof. J. B. Hodgkin then read the following report from the committee appointed to draft resolutions in memory of the late Dr. J. R. Walker, of New Orleans, La.

Dr. J. R. Walker was born in N. Y. State, in 1830; was educated in Ohio; studied dentistry in the private offices of several dentists; settled in New Orleans in 1854, where he practiced continuously (except during his service in the Confederate army). He was twice Vice-President of the American Dental Association, President of the Southern Dental Association, and was President elect of the National Dental Association at the time of his death.

He had been a Fellow of the American Association for the advancement of science, and Vice-President of the New Orleans Academy of Science, and a frequent contributor to scientific and dental journals.

He died at his summer home in Bay St. Louis, Miss., June 22nd, 1887, leaving a widow and five children.

Such was the man, who, were he still alive, would stand among us to day. But, to read his career as we should, we must needs go to the unwritten records made on our minds and hearts by the man himself.

Strong, magnetic, attractive, and, above all, self-sacrificing as a worker for the profession he loved so dearly, and for this association, which was his pride. One of the very first in conceiving the idea of its organization, and one of the foremost in working for its early life, he spared no pains and hesitated at no self-sacrifice which would forward the interests of the Southern Dental Association. His time was its time, his money its money, his thought and care

were the thought and care of the organization which, frowned at by some and sneered at by others, kept alive because a few choice spirits, of whom he was one, resolved that it should not die. He was with it when in its early days it met in the Middle West, so feeble that the dentists of the city in which it assembled had to elect some of the local practitioners members before a quorum could be had. And he was with it when it stood strong without help from other societies.

Would that he were here to see the full fruition of his hopes and labors in the nearly 350 assembled here to-day!

But he is gone! We still hear, in imagination, his voice in debate and counsel; we see the kindly glance of the eye, and hear the cherry tone of the voice of the always good fellow. No differences of sentiment made him less a friend; no clashing of interests made him less enthusiastic for his calling. So strong and manly, yet so genial and kindly, that even those he fought loved him.

It is a trite saying that "He who makes two blades of grass grow where but one grew before, is a benefactor of his race," but we hold that he who tries to make one more grow, even if he fails in his endeavor, is no less a benefactor in motive and in heart. And so, if it were that no association lived to "rise up and call him blessed" as one of its fathers; had this Southern perished by frost or blight, yet could we well applaud Dr. J. R. Walker and say, "He hath done what he could."

The motive makes the man, his impulses, his character, his heart; and we reverence that, though no fruition come of all its hopes and aspirations. The "Well done, good and faithful servant" was spoken of him who was faithful over a few things.

Our friend had his convictions, and the courage to sustain them. We might not always agree with him, but they worked his individuality, and made for him a character. Enemies may snarl, but the man is there. The lesson of his life, to us, is worth learning.

He had a purpose, and tried to make circumstances aid his purpose rather than allow circumstances to mould his purpose.

We must ponder this lesson. Purpose! Circumstance! these two. Shall we drift with the tide, or take advantage of it? Circumstance without purpose is a tide to float on

to destruction. Purpose, with circumstance. takes whither-soever we will.

*Resolved*, That this association express its deep regret at the death of its late fellow-worker, Dr. J. Walker; its profound sympathy for his widow and children, and a determination that the fruits of the seed he planted with us shall have a rich harvest in the prosperity of this association.

*Resolved*, That a page of the minute book be inscribed to his memory, and that a copy of these resolutions be sent to his widow and children.

On motion of Dr. Catching the resolutions were ordered spread on the minutes, and a copy furnished the family of the deceased.

The following report from the "Committee of Conference" was read and accepted. [No report furnished.—Ed.]

After some announcements from Dr. J. Hall Moore, as to excursions, etc., a vote of thanks was tendered the Virginia State Association for its generous hospitality in this and other respects.

Thanks were also voted to the S. S. White Co., and Mr. J. W. Selby for assistance in arranging for clinics. etc.

On motion of Dr. Chisholm, thanks were tendered the Hygiea Hotel, and the Railroads for reduced rates.

The President then introduced Dr. A. M. Lulie, a veteran with bleached locks, who had devoted the talents and energies of a lifetime to the advancement of the dental profession, and the originator and inventor of cohesive gold foil.

Dr. Lulie then read a paper, giving the reasons why he had been deemed worthy of this distinction.

The discussion of Dental Hygiene was then continued.

"Mrs. M. W. J." the author of "Letters to Mothers on the care of Children's Teeth," being called upon, stated briefly the practical results of systematic cleanliness and diet in overcoming both heredity and environment in the children of a number of families, and especially her own five children. In the latter case, from their ancestry on both sides they were eminently liable to inherit very poor teeth,

increased by residence in a portion of country unusually destitute of mineral elements in drinking water, etc.—Through the negligence and skepticism of the mother, no special precautions were adopted with the oldest child, until the age of three years, when the teeth being very soft and decaying rapidly, thirteen fillings were inserted, and a radical change instituted in care and diet; with the gratifying result of so hardening the deciduous teeth that no fillings were needed after the third birthday, and all the teeth but one retained until shed by nature's process. The second denture is unusually fine in structure and regularity, and at the age of nearly twenty-one, the teeth are all in place, in well developed, regular arches, without any fillings except that the imperfect fissures of the first molars were early cut out and filled to prevent decay. The second child retained all the deciduous teeth in perfect condition, without one exception. He erupted a central incisor with a pin-head-sized spot of yellow, softened dentine, on the labial surface, midway between cutting edge and gum which melted out, and at the of *eleven months*, was filled with cement. At the age of two years it was refilled with amalgam, and at the age of three years with gold—more as a curiosity than from any real necessity. The permanent incisor was similarly marked in the same position with a white spot, which, without softening, has, at the age of eighteen, grown down to the cutting edge of the tooth, like a white spot on a finger nail. As the result of special dental hygiene, the five children (the youngest now eleven years old) have all exceptionally fine dentures. The third child, however, presents the anomaly of having never erupted the second bicuspid, nor the left superior lateral and canine. The deciduous teeth, when shed were absolutely perfect, without a speck of decay, and with about the usual amount of absorption.

Dr. Dunlap (Selma, Ala.) read a communication from the Alabama State Dental Society, on the subject of lectures to the public on Dental Hygiene.

On motion, the paper was adopted, and laid over for action next year.

Dr. Richards (Knoxville, Tenn.) spoke of the lamentable condition of the teeth of the common soldiers in Fortress Monroe, as evidenced by the patients furnished for clinics, and said that something should be done to direct the attention of Government to this matter. The appointment of dentists in the army and navy would not interfere with the work of physicians and surgeons. They should co-operate with each other. A noted physician had said the army could be fed at one-third less expense if the soldiers had good molars. He hoped the Association would take some action in this matter.

The subject of Pathology and Therapeutics was called.

Dr. W. C. Wardlaw (Augusta, Ga.,) read a paper entitled,

NEURALGIA, ITS ASSOCIATION WITH DENTAL LESION.

Dr. J. J. R. Patrick then read a paper on the correction of Irregularities, illustrated by a large working-model and a series of charts.

Dr. W. H. Atkinson criticised the term "exuviation" to designate the absorption of the deciduous teeth. He said there was a return to embryonic conditions at the point where absorption takes place, and the debris taken up at the point where the molecular metamorphosis occurs. He would also like to correct all the fanciful generalizations offered in the explanations, but time would not permit.

Dr. Patrick said that "absorption" was an indefinite term which did not mean anything in particular. There were two kinds of absorption, external and internal, one of construction, one of destruction; one builds up, the other tears down; while we are absorbing that which lower organisms have built up, the earth and the atmosphere around us are absorbing our tissues. Cuvier uses exuviation as the correct scientific physiological term. It is a physiological process; opposed to the pathological process exfoliation.

Dr. Atkinson said this was mere discrimination without distinction. Exuviation was throwing off a cornuous

layer of epithelium, made possible by taking fluids from the external walls of the cells a process of throwing off through desication. The lime-salts are melted and carried away through the lymphatics.

The hour having arrived for the election of officers, Dr. J. R. Knapp, (New Orleans,) said that as the Association had decided to go to Kentucky next year, it would be most fitting to have a standard-bearer from that State. He therefore nominated, Dr. J. H. Prewitt, of Madisonville, Ky., the Demosthenes of American Dentistry.

The nominations was recorded by Dr. Storey (Dallas, Texas.)

Dr. Freidrichs (New Orleans,) moved to close the nominations.

This was not seconded, and Dr. Winkler (Augusta, Ga.,) nominated Dr. B. H. Catching, First Vice-President of the Association one who has labored for years to advance the interests of the profession, and who had contributed largely towards building the Southern Association up to its present status. On a previous occasion he had withdrawn from the contest when there was every probability that he would have been elected and it was only justice that he should have the honor now.

The nomination was seconded and nominations closed.

Five minutes' recess was taken to enable newly elected members to pay their dues, Dr. J. R. Knapp called attention to the fact that payment of the initiation fee counts as the first year's dues, and entitles to vote.

Drs. Winkler and J. R. Knapp were appointed tellers.

On the first ballot Dr. B. H. Catching receiving a majority of all the votes cast, his election was, on motion of Dr. Prewitt, declared unanimous.

The President said that the result afforded him great satisfaction, as the newly elected President was a man tried and true; one in whom all confidence would be placed, and one who would know how to fulfill every duty. He said that he was about to congratulate Dr. Catching, but instead



he would congratulate the Southern Association on the wisdom of their choice.

Dr. Catching replied briefly, accepting the honor with sincere appreciation of all that it implied, and declaring that he would, if possible, work harder in the future than he had done in the past. He said that he wished that he had the gift of oratory of his friend from Kentucky, that he might thank them in fitting terms for honor conferred.

Dr. Winkler then nominated Dr. J. H. Prewitt for First Vice-President, and the Secretary was instructed to cast the ballot.

Dr. Prewitt, in accepting the position, said that he had been honored beyond his merits. He promised that he would try, in meeting in his own State, to play a correct Pythias to Catching's Damon.

Dr. W. N. Morrison, St. Louis, Mo., was elected Second Vice-President.

Dr. J. Hall Moore, Richmond, Va. Third Vice-President.

Dr. Thackston expressed his gratification at the election of this old and tried friend, to whose labor it was due that the present meeting had been the great success it was. His past services were the guarantee of what the future would be.

Dr. J. Y. Crawford, Nashville, Tenn., Corresponding Secretary.

Dr. L. P. Dotterer, Charleston, S. C., Recording Secretary.

Dr. H. A. Lowrance, Athens, Ga., Treasurer.

Were all re-elected to their several offices.

Drs. Edwards and Doyle, of Louisville, Ky.; and Dr. Wm. Dancy, of Jacksonville, Fla.; were elected on the Executive Committee.

Adjourned to 8:30 p. m.

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FRIDAY, SEPTEMBER 2, 9 P. M.

The President in the chair.

Dr. McKellops, chairman of the committee on Volun-

ary Essays, stated that during his last illness, Dr. J. R. Walker, of New Orleans, had prepared a paper for the present meeting, which had been given to the committee.

On motion the paper was read by title:

THE FUTURE OF DENTISTRY—A PROPHECY,

and ordered published in the proceedings.

Dr. W. D. Dunlap stated that Dr. Reese, of Galveston, Texas, had promised a paper if his health permitted, but that the paper had not come to hand.

The President replied that he would be pleased to receive it, and would order it published.

The subject of Pathology and Therapeutics, and especially the paper from Dr. Wardlaw, being open to discussion.

Dr. Gnese (Baltimore) gave the history of a case of so-called neuralgia, due to dental lesion. The lady had been under treatment of physicians for some time, for neuralgia; five good teeth had also been sacrificed, without relief. The pain was severe at night, with intermittent fever, loss of appetite, and great depression of spirits. Her remaining teeth were apparently good and of sound structure. As a sedative employed one not used here—the solid extract of *Papaver Alba*, spread on the margin of the gums an hour before seeking sleep (with the precaution given to swallow as little as possible.) As the effect she had the best night's sleep she had enjoyed for three or four months. Thorough examination, the next day, revealed softened dentine between the bicuspids all around a filling, which had exposed the pulp. Capping the pulp and a plastic filling gave entire relief, and there has been no recurrence of the pain—now six weeks since the operation.

Dr. R. Finley Hunt said that though he agreed in the main with the paper, he must differ from Dr. Wardlaw on some points, especially in his positive statement that neuralgia, as a rule, is produced by lesions of the dental

structure. Pure neuralgia exists without any special lesion, being a systemic abnormal condition. The pain due to dental lesions is not pure neuralgia, which may exist when the teeth are perfect—without a particle of decay. There is much neuralgic pain due to defective teeth, and to deposits of even a very small quantity of salivary calculus; another form is due to too incessant smoking, and is cured by limiting the number of cigars. We are continually encountering the difficulty of indefinite nomenclature. We should endeavor to fix upon terms that when we use them to-day shall mean the same thing to-morrow.

Dr. L. G. Noel (Nashville, Tenn.,) read a paper entitled,

**"ETIOLOGY OF CARIES OF THE TEETH VIEWED FROM THE  
STANDPOINT OF PHYSIOLOGICAL CHEMISTRY."**

The paper was passed without discussion, and Prof. Hodgkin (Baltimore), read a short paper, entitled,

**"ARE WE JUSTIFIED IN PROMISING SUCCESS IN RE-  
PLANTATION?"**

Dr. Winkler then requested Dr. Morgan to explain the experiment made with cohesive gold.

Dr. Morgan said that the question had been raised whether aqua ammonia would render cohesive foil non-cohesive, and the matter had been put to the test as follows.

A bat of cotton was laid in the bottom of a box, over which a network of silk floss was stretched, on one end of which he had placed a sheet of cohesive gold "1,000 fine," No. 5, which he had examined and found decidedly cohesive. On the other end of the netting Dr. Winkler laid a sheet of No. 6 "globe foil, extra cohesive." The cotton was then saturated with ammonia, the cover closed and weighted and left closed for two hours. When the box was opened it was found that the "1,000 fine" had lost

its cohesion entirely. Of the other, one side of gold was still cohesive, but not enough to make it tear after being pressed together in paper. He therefore claimed that the question was settled in the affirmative.

Dr. Winkler said that Dr. Morgan had stated the facts very clearly, but that he did not accept the experiment as entirely satisfactory. The box was narrow, the amount of cotton was considerable, the fibres being raised up by the absorption of ammonia. One oz. ammonia was used in the box. The box should have been opened sooner, the moisture from the evaporation of the water of the aqua ammonia having had time to take effect on the gold. The foil was not very cohesive, and the upper surface was as much so after as before the experiment. The gold should have been freshly annealed. The cover had sprung; the box was wet, enough water remaining to be poured out of the box. Only one sheet was found that was not at all cohesive, and that was like it had been put in a water bath; in fact, he thought the effect produced due entirely to moisture, and not to the fumes of ammonia.

Dr. Morgan said he had not made any claim for the "fumes of ammonia;" he had said "aqua ammonia," and did not profess to know to what the effect was due. He would admit, however, that the time required had been longer than he had anticipated. He had often done it in five minutes, by passing the foil over the mouth of a vial of aqua ammonia. He had consulted various metallurgical authorities—among them Dr. Leslie and Dr. J. J. R. Patrick, and they said, "Oh, yes; it would do it beyond question."

Dr. Winkler asked why he supposed one side was not affected?

Dr. Morgan replied, because the fumes were stronger on the under side, the gold should have been turned over.

Dr. Beach (Clarkesville, Tenn.) said the only thing proved was that *something* had caused the change; whether water or ammonia was not proved. Cohesive foil can be

made non-cohesive by dipping in water and drying, but it cannot be relied upon with certainty. Chloroform will also produce the same effect.

Prof. Hodgkin moved that the subject be passed, and the experiments continued at home.

On motion of Dr. Hunt, Drs. Morgan and Winkler were appointed a committee to pursue the experiment and report at the next meeting.

The President suggested that the whole thing pertained to metallurgy rather than to the topics properly under discussion.

Dr. Morrison (St. Louis) said that from his long experience in replantation, he wished to answer Dr. Hodgkins' paper. He had had so many successful cases that he considered it in every way a legitimate operation. The case of Dr. Hodgkin was a peculiarly unfavorable one, and the great mistake made of not removing the root vessels and filling the canals. He had in mind a case of replantation in tolerably good condition after twelve years' service. From lack of care, and allowing deposits of tartar on one side there was now some absorption on that side.

The whole secret in caring for the teeth is to rub the whole surface of the gums with the finger or tooth brush; there will then be no red margins and no absorption. Another mistake was in not preparing a proper splint to hold the tooth perfectly quiet from the beginning; it should be held like a broken bone. He had had his failures, it was true, but his successes so far outnumbered them that he felt gratified in urging perseverance in the method. He felt very grateful to Dr. Younger for his experiments in making sockets in edentulous space and resurrecting dead teeth. It strengthens his faith in his own methods.

Prof. Hodgkin said that he was on the mourners' bench, and ready to be converted; especially since he had just learned that his friend Staples, from Texas, had had a central incisor picked up out of the dirt and replaced, which did good service for thirty years.

The subject was passed, and Histology and Microscopy called.

Dr. Stublefield (Nashville, Tenn.) read a paper on the

"HISTOLOGY OF HARD STRUCTURES."

At the conclusion of the paper, it being nearly midnight, the Association adjourned, to meet on board the steamboat Jane Moseley the next day, *on route* to Washington City.—*Southern Dental Journal*.

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ARTICLE II.

A NEW METHOD OF TREATING TEETH WITH  
DISEASED PULPS.

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BY WILHELM HERBST.

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Read at the Meeting held in Frankfort-on-the Main, April 30—May 2, 1887.—Translated from the Correspondenz-Blatt fuer Zahnartz, by L. C. Huyo, D. D. S.]

Probably on no one subject connected with dentistry has there been so much said and written as on the treatment of diseased pulps. I take pleasure in presenting a method which I have employed for the past two years with much success. During this time I have saved almost all teeth having aching pulps; and but very seldom has the treatment been attended by untoward sequelæ. I deem it my duty in the interest of our specialty to make known my method, though I know that many a one who swears by root-fillings and antiseptic treatment will incredulously shake his head.

When a patient with an aching tooth comes to me, the pain originating in the pulp, I first syringe the cavity with warm water and carefully remove all extraneous matter and the softened dentine, using cocaine for the palliation of pain. Then, on a pledget of cotton, I take up some cobalt

(*arsenic, metallic, crud.*, moistened with carbolic acid, and lay it on the pulp, covering it carefully with very soft gutta-percha, and taking particular care that there is no undue pressure. I ask the patient to return in two or three days, when I remove the application and enlarge the pulp-chamber with a sharp, rather good sized round bur. After the carious portion of the tooth has been removed, I proceed at once to fill,

The pulp-chamber must be thoroughly syringed with water and dried with punk or bibulous paper. It is then filled with tin, or, better still, with gold and tin—this to be inserted with considerable pressure by the rotation method\*. Hereupon the crown cavity proper is filled with gold, gold and tin, cement or amalgam, and, as a rule, the tooth is thoroughly cured.

The cobalt should be kept in a glass phial containing a little carbolic acid. The cotton pledget is dipped into this phial, so that some of the cobalt may be caught up. Before carrying the application to the cavity, the excess of carbolic acid must be soaked up by means of punk or bibulous paper. In drilling out the pulp chamber, one should have a care not to use too small burs, lest the root canals be entered. Under no circumstances must the attempt be made to enter the canals with broaches, excavators, probes, etc., in order to remove the rest of the pulp. For filling the pulp-chamber, I take either tin-foil No. 4 alone, or a sheet of tin-foil No. 4 and one of gold No. 4, so rolled together that the latter may be on the outside. (See *Correspondenz Blatt* for April, 1887, page 120). This combination of foils is placed in the cavity with rather blunt instruments, and then firmly condensed with head-shaped rotation-points, so as to *hermetically seal the chamber*. To this part of the operation I would call especial attention. While enlarging the pulp-chamber, if there should be much sensitiveness, cocaine should be used

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\* *His method.*—*Translator.*

to secure relief; sometimes it may be necessary even to make another application of cobalt.

The perfect sealing of the chamber can be accomplished by the rotation method only. I regard it as almost impossible with hand pressure or mallet force. For filling the pulp-chamber nothing but tin, or tin and gold, should be used.

It is remarkable that hardly any change of color takes place in teeth treated after the manner described. If it is desired to fill the crown cavity with cement or with gold, the chamber should be filled with tin; but if amalgam is used, gold and tin in combination must be employed, since mercury attacks the tin. Fast-setting amalgams is best here.

Success depends upon hermetically sealing the pulp-chamber.

The question now arises, what becomes of the pulp-stumps? which, as a rule, are alive. According to my opinion, they gradually die, and are disposed of by resorption. I have several times had occasion to examine the root-canals of teeth treated as above. From some cause the amalgam fillings had dropped out; but the seal over the canals had been undisturbed. After applying the rubber dam and drying the teeth, I found that upon removing the tin seal the root canals were *quite empty and odorless*. The pulp-stumps must have died and become resorbed.

The operation is most difficult in the distal exposures of molars. There is not much trouble when the grinding surface over the cavities has become partially disintegrated and access can be gained to the pulp chamber by means of chisels or burs; but cavities accessible only by the angle-piece present some difficulty.

Cobalt—the best may be obtained from apothecary Nonne of Bockenheim, near Frankfort-on-the-Main—is a most valuable drug in dentistry and is preferable to the white arsenic. When employing my method, it is important that the treated teeth or their antagonists be somewhat



ground off at the occluding surface, and that the filling be not built so high as to receive too much pressure during mastication.

I have waited two years before making public what, in my opinion, is a most important innovation. Many hundreds of teeth have I treated by this method with the greatest of success. I beg that it receive earnest consideration, and that my directions be accurately followed.—*Southern Dental Journal*.

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ARTICLE III.

IMPROVED ARTIFICIAL TEETH.

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BY DR. D. GENESE, BALTIMORE.

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In dental prosthetics, one of the greatest annoyances met with is fracture of the porcelain in one or more teeth of a denture after the finishing. It may occur before it leaves the laboratory, when it can be rectified to some extent, thereby saving the patient the annoyance of a broken tooth soon after having a case made; but the trouble still remains the same to the operator or assistant. How much more so, when the patient leaves us to take a journey, fully satisfied that one thing at least is all right, when, lamentable to relate, just on the start a sudden closure of two over-arching teeth, one of which having received a flaw, gives way. What annoyance to all concerned—dentist, assistant and patient! Does the piece of work ever look the same, or is the patient satisfied? A dread is constantly present that the accident may occur again. Our client may charge us with carelessness, while we think the fault is on his side.

What is the cause of this trouble? It occurs in all forms of teeth, from the furnaces of every manufacturer, both in this country and abroad. Why? Because they

place a lever in every tooth and use the pins as the fulcrum. They use materials having no affinity with each other, each one having to support the other by the bulk of material increasing at the parts uniting, not by fusion, but contraction, on each other, breaking up the unity of both tooth and base, trusting to the rivet-head of two small pieces of wire to hold all together.

And now comes the question, what causes the rivet-heads or pins to pull out from the porcelain instead of from the softer companion rubber, or from the backings in plate-work, instead of the tooth, in such cases?

In the first place, the tooth substance forms a hole or holes similar to a draw-plate, and the continued traction will pull the pins out as clean as from a draw-plate of steel; and the remark is often made, why don't they put heads to the pins? If we examine a tooth from which pins have drawn out, we will find it countersunk, with a clean, vitrified circular hole from the head to the surface.

Another consideration must be taken into account. Metal wire on tension will stretch, and the space left between the tooth and backing, or tooth and rubber, will, by capillary attraction, get filled with moisture and act as a hydraulic force, independent of the pressure of mastication.

We must also remember that in nearly all our work we depend upon teeth attached only by pins inserted in the centre, or nearly so, of the tooth or teeth having a constant leverage from both ends. Is it any wonder that such a frail substance breaks when we put the greatest strain on the weakest point?

It is not generally known how double-headed pins are inserted into the teeth, what pressure is put upon them during the process, or what has been done to weaken them previous to their getting into the hands of the dentist. First, the wire is drawn, then cut and headed; next, they are inserted into the body of the tooth by pressure, and when the teeth are biscuited, defects around them are filled in. Now comes the firing, and in this process they are

twisted considerably out of shape. It would not do to send them out in this state, so poor pins are twisted again to look nice, and we have a faulty article to start with. Finally, the very insertion of the pins so weakens the tooth that the wonder is, how they stand so well.

How are we to overcome this trouble? For vulcanite work, do away with metal altogether; it leaves the porcelain solid throughout, and the contraction of the rubber, instead of leaving a space between it and the teeth, draws them (the teeth) closer to it and prevents the accumulation of debris, so detrimental to the dental piece and the health of the patient.

But you will say, what shall we do in metal work? Well, gentlemen, do the same, with a difference. Keep your porcelain solid throughout; make your metal cylindrical, from the cutting edge of the tooth to the root; at the same time, so arrange the metal that it permits of expansion and contraction of both porcelain and metal independently of each other.

I have brought specimens of both forms of teeth herein described, and would call your attention to the tube teeth of Ash & Sons, which resemble in some respects what I would show you. The difference is plainly perceived, both for the vulcanite and the metal work.

In the first mentioned I take advantage of a tripod groove running through the buccal and labial surface of the teeth, giving the greatest support where most needed, without weakening the grinding surface or the hold of the rubber to the teeth.

In the teeth for metal you will find the cylinder placed in the centre, a spring space running to the back receiving the greatest pressure in masticating, at the same time uniting the tooth to the plate by a large central holdfast, besides the ordinary backing which has already been burnt to the tooth, and will not, therefore, shrink or expand again like the ordinary backings riveted to pin teeth.

The combined strength and simplicity of arrangement,

I trust, will remove a great source of annoyance in our daily practice, besides giving greater satisfaction to our patients and substantial security to our work.—*Southern Dental Journal*.

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ARTICLE IV.

ODONTOMES.

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BY J. BLAND SUTTON, F. R. C. S.

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Hunterian Professor; late Erasmus Wilson Lecturer on Pathology, Royal College of Surgeons; Honorary Member of the Odontological Society of Great Britain.]

In the most extended sense an odontome may be defined as *a neoplasm composed of dental tissues (enamel, dentine, and cementum), in varying proportions and different degrees of development, arising from tooth-germs, or teeth still in the process of growth.*

It is customary to restrict the term, at least from the clinical point of view, to those hard tumours found in the jaws, composed of fully developed enamel, dentine, cementum, or varieties of these tissues. Nevertheless, the careful observations made by several workers during the past few years render a reconsideration of the matter imperative; for the term should apply not only to solid dental tumours, but to certain cystic forms as well. This extension of the term is of some importance, for we can then include several curious aberrations of tooth-development.

In the higher mammals three distinct parts are concerned in the formation of a tooth:—

1. The enamel organ, derived from the surface epithelium.
2. The dentine papilla.
3. The follicular wall, which, with the surrounding tissue, furnishes the cementum.

It would be obviously convenient if we could base a

rigid classification of odontomes upon the embryological history of a tooth. This method, which has been the one mainly adopted since its introduction by Broca in 1869, has not been attended with success.

In the present essay I shall venture to classify odontomes in four groups. The novelty of the method of classification proposed consists in including certain cystic formations and fibrous tumours of the jaws among odontomes. How far this course is justifiable will be seen by the evidence which will be placed before you. The accompanying table represents in a complete form the mode of classification suggested. One of the chief features in this proposed method of arranging these tumours is, that the mode of genesis of the odontome, as well as its structure, is taken into consideration.

#### CLASSIFICATION OF ODONTOMES.

##### A. *Aberrations of the Enamel Organ*—

1. Epithelial Odontomes.
2. Calcified Epithelial Odontomes.

##### B. *Aberrations of the Follicle*—

1. Follicular Cysts.
2. Fibrous Odontomes.
3. Cementomata.

##### C. *Aberrations of the Papilla*—

1. Radicular Odontomes—
  - a. Dentomata.
  - b. Osteo-dentomata.
  - c. Cementomata.

##### D. *Aberrations of the whole tooth-germ*—

Composite Odontomes.

##### E. *Anomalous Odontomes.*

##### A. *Aberrations of the Enamel Organ.*

*Epithelial Odontomes.*—This name is applied to those tumours which probably have their origin in aberrations of enamel germs, either of teeth which, normally, should go

on to full development, or, as Mr. Eve suggests, from epithelial ingrowths around the dental alveoli, some of which may possibly be regarded as the representatives of teeth long since suppressed in the process of evolution.

To Mr. Eve belongs the credit of drawing attention to the true nature of this kind of odontome, under the name of multilocular cystic epithelial tumor. Details of some thirty cases are now known, from which the following characters have been drawn:—

Most of the patients come under observation at the age of twenty years, although the disease may occur at any period from infancy to old age. More commonly the lower jaw is affected, and the molar region is usually, though not exclusively, involved.

In typical specimens the tumour displays on section a congeries of cysts, in size very various, but they rarely exceed an inch in diameter. The cysts are separated by thin, fibrous septa, in some cases by osseous tissue. The cavities are, as a rule, filled with mucoid fluid of a brownish colour. The growing portions of the tumour are of a reddish-brown colour, not unlike that of a myeloid sarcoma.

Histologically, these tumours are composed of branching and anastomosing rods or columns of epithelium, portions of which form alveoli. The stroma is composed of fibrous tissue; when abundant, embryonic tissue in various stages is present. The cells occupying the alveoli vary; the outlay layer may be columnar, whilst the central cells degenerate and give rise to a reticulum of stellate cells resembling in structure the *stratum intermedium* of the enamel organ.

The naked eye appearance of these tumours is very characteristic. It is usual to find that in many of these cases, as in odontomes generally, absence of one or more of the teeth in the molar region. In the specimen represented, all the teeth in front of the molar were absent. The incisor shown in the figure belonged to the right side. The defect in the number of teeth in these cases supports

the views also of Falkson and Bryck, who believe that, in some instances at least, these cysts have their origin in persistent portions of epithelium forming the enamel organ of developing teeth.

Mr. Eve's views concerning the origin of these odontomes from germs of teeth, or of suppressed teeth, has received considerable support from the observations of Malassez. This investigator has detected spherical, oval and cylindrical masses of epithelium within the periodontal membrane, and extending from the gum to the apex of the fang of a tooth. The epithelial collections are chiefly distributed below the necks of the teeth, and at the upper part of the root.

It is also satisfactory to find that Mr. Heath believes these views to be confirmed by clinical experience, and he adopts the term multilocular cystic epithelial tumour in preference to the older and very unsatisfactory name of cystic sarcoma. From a clinical, pathological, and evolutionary standpoint, I accept these views unreservedly, and feel that this mode of regarding tumours is a very distinct advance upon the usual narrow lines adopted in the study of human pathological anatomy.

*Calcified Epithelial Odontomes.*—We must now consider the relation existing between such tumours and the hard odontomes. It has already been mentioned that the septa in these cystic tumours, though usually fibrous, are occasionally composed of bone, and it certainly is easy to perceive that if the mass became in great part ossified we should obtain a hard odontome. On this head, Mr. Charles Tomes has stated that he has observed in at least one specimen of calcified odontome a structure which was such as would be produced by calcification of such tumours. It was for the most part made up of the products of calcifications of an infinitely branched enamel organ, there being little trace of dentine or of anything which appeared to have been derived from the calcification of a dentine pulp. A specimen which seems to belong to this form is one figured and described by Wedl.

Before dismissing aberrations of the enamel organ, mention must be made of the following, probably unique, specimen of a single cyst occupying the right side of a jaw, preserved in the Museum of the Royal College of Surgeons. It is thus described by Mr. Eve:—

"It contains no trace of a tooth, and the structure of its wall shows that it is not dentigerous or follicular, in the strict sense of the term, for it is lined by a thick layer of small round-celled epithelium. This may have originated from the expansion of a rudimentary enamel organ owing to the collection of fluid in its interior."

This cyst is of considerable interest, not only for the ætiological interpretation which may, with good reason, be applied to it, but because it illustrates the destructive effects of a central cystic growth upon the lower jaw. In this case the bony plates forming the angle and ramus of the maxilla are expanded into very thin laminæ; the condyle, detached from the ramus, is attached to the summit of the cyst by fibrous tissue; the coronoid process is in a similar condition, and the temporal muscle forms an exceedingly thin investment to the outer part of the cyst wall.

#### B. *Aberrations of the Follicle.*

1. *Follicular Odontome.*—The term follicular is here adopted in preference to the older adjective dentigerous, because the latter term has often been applied loosely to any cyst which bears teeth. The result of this inexactness has been to induce confusion, because all cysts which bear teeth are not dentigerous, even when they occur in connection with the jaws; for those curious cysts termed dermoid, and the heterogenous masses, called parasitic fœtuses, often contain teeth.

The true dentigerous cyst can only occur in connection with the jaws, and is to be regarded as a distension of the follicle in which the developing tooth is enclosed. If we can agree to apply the term *follicular* to such cysts, misapplication of the word is less likely to ensue.



An extended study of these cysts has led me to some interesting conclusions, for I think it will be possible to show that certain forms of odontomes of the hard variety arise from aberrations of this particular element of a tooth.

The characters of follicular cysts, as is well known, are the following:—

They arise in relation with teeth which have remained within the jaws—retained teeth; they are connected most commonly with those of the permanent set, but may affect also a temporary tooth; this, however, is rare. They are most frequently connected with the molars, and occur in the upper and lower jaws. In the latter situation they expand the bone and produce extensive deformity, tending the surgeon to believe that he has to deal with a solid tumour. In the upper jaw the cyst invades the antrum. In the simplest variety the cyst wall is composed of fibrous tissue, and the cavity is filled with glairy viscid fluid. Projecting into the cyst in most cases is the fang of an undeveloped tooth; sometimes, however, the tooth lies in the cavity of the cyst, and in rare instances the crown of the tooth is well formed, but the fang is imperfect.

Follicular cysts are liable to secondary changes; one of the most frequent is calcification of the cyst wall. All cysts of this nature which I have been able to examine presented this character. The amount of calcareous material varies; in some instances the wall is a shell of bone.

The best explanation yet offered concerning the ætiology of follicular cysts is that by Tomes, viz., that they arise from excessive formation around a retained tooth, that is between the enamel and the wall of the follicle, of a fluid which is normally found after the complete development of the enamel.

A follicular cyst may suppurate. This event seems to occur most frequently in the lower mammals.

2. *Fibrous Odontomes*.—In a developing tooth a portion of the connective tissue in which it is embedded is

found to be denser and more vascular than the rest; it also presents a fibrillar arrangement. This condensed tissue is known as the tooth-sac, and when fully developed presents an outer firm wall and an inner looser layer of tissue. At the root of the tooth the follicle wall blends with the dentine papilla, and is indistinguishable from it. Before the tooth cuts the gum it is completely enclosed within this capsule.

The tooth-sac attains a large development in ruminants, especially the inner layer, in order to provide the large deposit of cementum for the crown of the tooth in this group. It must, however, be borne in mind that the follicular-sac is not alone responsible for the cementum.

This large development of the tooth-sac in ruminants is of some interest. In 1885 I described before this Society the skull of a goat which presented in each upper and lower jaw a thick-walled cyst developed in relation with a molar tooth. An examination of the wall of these cysts, aided by the microscope, showed it to be made up of lamellæ of fibrous tissue undergoing ossification. In the same paper I was able to describe a second case, also in a goat, and refer to one probably of the same nature recorded by Virchow. Since, an additional specimen has come under my notice, also in a goat.

This year I have had the good fortune to find another specimen in a *Dasyure*, which died in the Zoological Gardens. The skeleton was everywhere softened by rickets, the lower jaw being so flexible that it could be twisted as easily as gutta-percha. On examining the head, each upper jaw was found to be occupied by a tumour of the size of a walnut; each tumour was distinctly encapsuled and of a deep flesh-colour on section. It is not a little remarkable that in all cases of this form of odontome, the growths are symmetrical. This case differs from that of the goats inasmuch as the upper jaws alone are affected by the tumours. It is a curious fact, in so far as man is concerned, that in nearly all the recorded cases of odontomes the tumour occupied the lower jaw.

On microscopical examination the tumour was found to consist of lamellæ of dense fibrous tissue, enclosing a central softer portion in which the fangs of a molar tooth projected. In many parts of this dense capsule tracts of bony tissue were found. Near the centre of the mass the fibrous layers became attached to the neck of the tooth and seemed to blend with the periodontal membrane. The central softer part of the tumour contained numerous giant cells and embryonic connective tissue; in some of the more successful sections a direct continuity of this tissue with the pulp of the teeth was clearly made out.

The chief difference in this specimen and that of the goat previously described, consists in the circumstances that the tumour in the Dasyure was far less ossified than in the goat. Possibly the presence of rickets may help to explain the difference.

We must remember that Broca, under the term *odontomes embryoplastiques*, included certain cases of fibrous tumours in the upper and lower jaws, and certainly the specimens from the goats and opossum support this view. I am further convinced that several of the tumours described in Mr. Heath's work on the "Injuries and Diseases of the Jaws" are of this nature.

Other examples may be mentioned, but the above are sufficient to leave little doubt on the mind that a few fibrous tumours of the jaws are in reality odontomes in course of development.

3. *Cementomata*.—In this variety the bulk of the tumour is made up of cementum, often arranged in layers if the tumour be large.

The most typical cases of cementomata occur in horses, and may attain a large size. Their frequent occurrence in the ungula generally need not surprise us when we remember the abundance of cementum present normally in the teeth of these mammals.

Broca has described specimens of this kind occurring in horses, in connection with the molar teeth, and similar

cases have been placed on record by Rosseaux, Goubaux, and Magitot.

In 1871 Mr. Charles Tomes described in the "Transactions of this Society" an odontome connected with the molar tooth of a horse. The tumour was five or six times larger than the tooth, and weighed ten ounces.

A careful consideration of such cases left a very strong impression on my mind when studied in connection with the tumours described in the jaws of the goats namely, that had the goats lived, the soft tumours in their maxillæ would have become completely ossified, and given rise to hard odontomes—in fact, cementomata.

Fortunately, whilst engaged in studying the tumour of the jaw in the Dasyure, and the thick-walled cysts, other specimens came to hand, which have enabled me to raise this view from the domain of probability. These specimens will now be considered in detail.

### c. *Aberrations of the Papilla.*

*Radicular Odontomes.*—This term is applied to odontomes which arise after the crown of the tooth has been completed and whilst the roots are in the process of formation. As the crown of the tooth, when once formed, is unalterable, it naturally follows that should the root develop an odontome, enamel cannot enter into its composition, which, for the most part, would consist of dentine and osteo-dentine in varying proportions, these two tissues being the result of the activity of the papilla.

When such a tumour consists mainly or entirely of dentine it may be termed a *radicular dentoma*. If osteo-dentine preponderates, then the tumour may be called a *radicular osteo-dentoma*; or if cementum, then it is a *radicular cementoma*. The terms in each instance clearly set forth the source of the tumour as well as indicating the structural characters.

Radicular odontomes, though very rare in man, are comparatively common in mammals, especially rodents,

whose teeth grow from persistent pulps. It is impossible to decide the nature of the tissue composing them without seeking aid from the microscope. Examples of each form will now be given:—

1. *Radicular Döntomata*.—As has just been stated, this form of odontome occurs with greatest frequency in rodents, the purest forms occurring in marmots.

It may here be mentioned that odontomes in the lower mammals are by no means most frequent in the lower jaws, as in man. Not uncommonly they are multiple.

2. *Radicular Cementomata*.—Odontomes of this variety differ in no respect in their external characters from those just considered. As is the case with nearly all odontomes, suppuration and necrosis of the bone had taken place. The pus had travelled along the socket of the tooth, which was so large that the teeth moved loosely in the jaw.

On microscopic examination three-fourths of the tumour was found to be composed of cementum. Small patches of dentine were detected here and there throughout the mass, and dark interglobular spaces.

Professor Windle and Mr. Humphreys have recently described from the human subject a specimen which seems to belong to this variety. It occurred in a young man aged twenty-five. The odontome was situated in the lower jaw, on the right side, in the neighbourhood of the second molar tooth. After more than four months' excruciating pain, accompanied with profuse suppuration, life being several times despaired of, the odontome, seven months after its presence was first noticed, became liberated and fell into his mouth. The crown is fairly well formed, the labial surface being perfect, the lingual somewhat tuberculated. The roots are fused into an irregular mass. The under surface is irregular, and is at one point excavated into a hollow.

It is much to be regretted that it is impossible to obtain sections of this interesting tumour. As far as can be judged, the odontome consists of cementum overlaid in places with enamel.

It is far from the purposes of this paper to deal with the effects of odontomes, but the clinical history of the preceding case is very valuable, we read "his life being several times despaired of." In many of the recorded cases a train of severe symptoms, and in some, terrible mutilation from the surgeon, has been the result of these tumours. In one case the operative procedure was followed by death.

In the case of one of the marmots, in the porcupine, and in the agouti, I am convinced that death resulted from the profuse suppuration and necrosis set up by the odontomes. When we remember the serious trouble frequently caused by the cutting of a wisdom tooth, we can very well understand the amount of constitutional disturbance likely to be caused by the eruption of a mass, two, three, four or more times the size of such a tooth.

*Radicular Osteo-dentomata.*—Structurally these are of hard tissue, traversed by canals which contain blood vessels. The dentinal matter may be deposited in a globular form, from the vascular canals; tubules, resembling in their size and mode of ramification those of dentine, pass off and lose themselves indefinitely in the surrounding hard structure.

No odontomes belonging to this group have been described in the human subject, and as far as our present knowledge extends, the only mammal in which they have been described is the elephant.

It is necessary to draw attention to those large masses of osteo-dentine, which occur so frequently in the pulp of elephants' teeth, not only in the tusk, but also in the molars. These masses of secondary or osteo-dentine must not be regarded as odontomes, but as the direct result of inflammation of the pulp.

Small nodules of osteo-dentine are of frequent occurrence in the pulp of healthy human teeth, and excite but little surprise. It is only their bulk which causes wonder, when they occur in the pulp of elephants' teeth.

Similar formations of osteo-dentine occur normally in the teeth of the sperm whale and in the grampus.

D. *Aberrations of the whole Tooth-germ.*

*Composite Odontomata.*—This is a convenient term to apply to those hard tooth tumours, which bear little or no resemblance in shape to teeth, but occur in the jaws, and consist of a disordered conglomeration of enamel, dentine, and cementum. Such odontomes may be considered as arising from an abnormal growth of all the elements of a tooth-germ—enamel-organ, papilla, and follicle.

Up to the present time I have found no such odontomes in the lower animals, all the recorded cases having occurred in man. A typical odontome of this group is the one described by Mr. Heath, as occurring in the lower jaw of a young lady aged eighteen. The clinical history in this case is very instructive, and the reader is referred to the original account of it in the Clinical Society's "Transactions," vol. xv.

In the same category may be placed the odontome dislodged by Professor Annandale from the jaw of a young woman aged seventeen, who never had any molar teeth in the left lower jaw. It weighed 305 grains. It consisted of dentine and osteo-dentine, capped by enamel.

Not only is this class of odontomes composite in that the tumours comprised in it originate from all the elements of a tooth-germ, but they are composite in another sense. In the majority of cases the tumour is composed of two or more tooth-germs indiscriminately fused. But they differ from the cementomata containing two or more teeth, from the fact that the various parts of the teeth composing the mass are indistinguishably mixed, whereas the individual teeth implicated in a cementomata can be clearly defined.

E. *Anomalous Odontomata.*

In this section we must consider a few very remarkable cases. The first was placed on record by Mr. Tellander, of Stockholm; the details are as follows:—

A female, aged twenty-seven, applied to him in consequence of an attack of inflammation of the right upper jaw, due, as she supposed, to the presence of the roots of a temporary molar. The temporary teeth, so far as was known, presented nothing unusual, and were shed and replaced by the permanent set, except that on the right side of the upper jaw, the first molar, the two bicuspsids, and canine failed to appear. The spot where these teeth should have been became at the age of twelve the seat of hard painless enlargement. When the patient applied to Mr. Tellander there was a free discharge of pus from this spot; some stumps were removed, and carious bone detected. Subsequent examination showed that enclosed within this carious bone was a cluster of minute teeth. There were nine single teeth, each one perfect in itself, having a conical root with a conical crown tipped with enamel; also six masses built up of adherent single teeth. The denticles presented the usual characters of supernumerary teeth. About a year afterwards a tooth was found making its appearance in the spot from which the host of teeth was removed.

A similar case has been recorded by Sir John Tomes.

A third example of this remarkable condition has been recorded by Professor Windle and Mr. Humphreys, in the "Journal of 'Anat. and Physiology,'" vol. xxi. The case occurred in the practice of Mr. Sims, at the Dental Hospital, Birmingham. The tumour was found in the mouth of a boy aged ten years. It was found that neither the deciduous nor permanent right lateral incisor or canine had erupted. The space thus unoccupied was filled by a tumour with dense unyielding walls which occasioned no discomfort. On opening this cyst forty small denticles of curious and irregular forms were removed from the interior.

Mr. Heath records briefly a case of a similar nature in a boy, aged four years.—*Odontological Society, Dental Record.*



## ARTICLE V.

ON THE COMBINATION OF TIN AND GOLD AS  
A FILLING MATERIAL FOR THE TEETH.

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BY W. D. MILLER, M. D., PH. D., &C.

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[Being a series of Lectures delivered in the Institute and translated from the German by Miss St. George Elliott.] \*

*Gentlemen*:—You have all, no doubt, time after time, felt that among the many materials which nowadays are used for stopping teeth not one possesses the qualities of an ideal filling substance. You have, therefore, tried to overcome the difficulty as far as possible by choosing for each separate case that material which has the greatest number of the wished-for qualities, or, to speak more correctly, that material which has the fewest objectionable qualities.

You will also readily acknowledge that in many instances the question "With what shall I fill this cavity in order to obtain the best result?" is exceedingly difficult to answer and is imperfectly solved by the choice of that material which, in the opinion of the operator, *comes nearest* to what is desired.

Under these circumstances, it is evident that, through the introduction of a new and good filling material, the practical value of dentistry is greatly enhanced.

The material to which I wish to call your attention to-day, a combination of tin and gold, seems to me in many cases to very materially diminish the difficulties of the operation for both patient and operator, and to render possible the introduction of a more permanent filling than could be obtained by other means.

It is now about 25 years since the late Dr. Abbot, of

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\* At the request of the author, a number of changes made in the text, also the number of illustrations reduced to fifteen.

Berlin, first made use of the combination of tin and gold foil as a filling material; but although the Abbot method occasionally found an enthusiastic follower—I mention here only the names of my colleagues Drs. Jenkins, of Dresden, and Sachs, of Breslau,—it has only been in the past few years that a general interest in this important topic has been awakened, and this as a result of the many discussions in the different dental societies, and also the communications in the professional journals. This may be accounted for partly by the fact that the superiority of this substance was not well enough known, and partly by the circumstance that many, for fear that there would be an injurious electrical effect, did not dare to insert two different metals in the same cavity. There are still, in fact, at the present day practitioners who have this groundless fear of electrical disturbance. I have even met with cases in which dental practitioners have insisted upon removing such mixed fillings, under the supposition that they would necessarily injure the teeth, notwithstanding the fact that these teeth had, by the use of tin and gold, been kept for years in excellent condition.

For this reason it is thought to be in place, in connection with the tin gold filling, to point out the electrical processes which may take place in filled teeth in the human mouth. As is well known, Bridgeman, in a prize essay, has endeavored to trace back to electrical action the origin of dental caries. According to his view, there are electrical currents between the different parts of the teeth, for instance, between enamel and dentine, enamel and cement, dentine and cement, &c., by means of which the mass of the tooth is destroyed in pretty much the same manner, through local currents, as is a piece of impure zinc in dilute sulphuric acid. A theory of dental caries, so poorly supported by facts of experiment and experience, produced no particular impression. It was different, however, with the theories of Chase and others. They succeeded by means of experiments, which to my knowledge have never

been published, in constructing a series in which the difference of potential between the different stopping materials and dentine is shown. This series is as follows:—

Electro-negative	Gold
Amalgam	Tin
Gutta percha	Dentine
Oxychloride of zinc	Electro positive.

Each being E. N. to all that follow, and E. P. to all that precedes.

The result is that the greatest E. M. F. is generated by a combination of gold and dentine; the combination of amalgam and dentine furnishes a smaller E. M. F.; a still smaller that of gutta-percha and dentine. Based upon these and other experiments, Chase concluded that a tooth filled with gold would soon show a reappearance of caries upon the edge of the cavity, as a result of the strong current existing in all places where acid fluids in the mouth constantly wash the filling and the neighbouring tooth-substance. A tooth stopped with amalgam is less affected by this electro-chemical process, still less is one filled with tin—the proportion being 100, 67 and 50—while the tooth which is stopped with oxychloride of zinc, becoming electro-negative by contact with this material, remained secure against the action of acids, which are likewise electro-negative.

Chase also succeeded in proving (?) the truth of this reasoning by means of experiments. He procured several pieces of ivory of equal size and the same form, and bored a hole in each piece, filling these cavities with various filling materials. After these had been exposed to the action of an acid for a week, he found they had diminished in weight in the following proportion:—

The piece filled with Gold	-	-	0.06
"	"	Amalgam -	- 0.04
"	"	Tin -	- 0.03
"	"	Gutta-percha	- 0.01
"	"	Wax	- 0.01
"	"	Oxychloride of Zinc	0.00

Reasoning from these results, Chase came to the conclusion that among all the filling materials in use gold is the worst, and that every tooth filled with metal is a galvanic battery, which becomes active as soon as the surrounding fluids have an acid reaction. Practitioners of good standing, determined by the experiments of Chase, entirely gave up the use of gold as a filling material. Under such circumstances, it is easy to understand why it was thought unwise to place a mixture of two metals in the same cavity. It was believed, in spite of the non-existence of any satisfactory proof, that, if one metal had such a disastrous effect upon a tooth, a combination of two metals would increase the danger of injuring certainly two-fold, if not in greater ratio. Practical experience teaches us the fallacy of this conclusion, and indeed Chase's experiments and results were of a so surprising a nature that other dentists were immediately incited to repeat the same experiments, and, so erroneous, that the errors were at once made apparent. I, myself, five years ago, began two series of experiments, with the object of finding out:—First, whether an electrical current can exist between dentine and metal; second, whether the rapidity with which dentine is affected when laid in diluted acid is dependent in any wise upon contact with a filling material.

These experiments were made in the laboratory of Du Bois-Reymond, and the results were published partly in the *Deutsche Medizinische Wochenschrift*, and partly in the *Dental Cosmos*, from which I make the following extract:—

"What electrical actions take place when we bring a living tooth into contact with metal? It has been proclaimed that every tooth filled with metal is a galvanic battery, which becomes active as soon as the surrounding fluids have an acid reaction (Chase). This statement does not, however, rest upon any experimental facts. So far is this from being the case that its advocates openly admit that nobody has yet been able to detect this galvanic action, still less to measure the same.

"Regardless of these views, I maintain that there certainly are electrical currents to be found in the mouth when it contains teeth filled with metal. These currents do not, however, exist between the filling and tooth substance in such a manner that the latter can be compared to one of the plates of a galvanic element; but the electrical processes which really take place in the mouth owe their presence wholly to the heterogeneity of the metallic fillings.

"On the surface of every filling, even of one of pure gold (when, as is always the case in practice, the filling is not throughout of a uniform density), electrical currents will be generated which flow between the denser and less dense points. But since all of these currents do not tend towards the margin, no injury to the tooth may be feared."

"When two fillings composed of different materials come in contact in the same tooth, or in any neighbouring teeth, there follows a current which is directed through the mouth and fluids of the teeth from the more oxydizable (electro-positive) towards the less oxydizable (electro-negative) metal, and this, working electrolytically upon the fluids of the mouth, may possibly produce deleterious results. Through this, current acids are produced upon the surface of the electro positive metal which may attack the tooth around the edge of the filling. This action seems, however, almost entirely to cease as soon as the surface of the positive pole becomes oxydized; in short, practice has not yet proved this process in any wise injurious to the teeth.

"Electrical currents also appear in the mouth when metallic clasps surround teeth in which are metallic fillings, or whenever clasps of baser metal are placed on a gold plate. These currents are naturally weak; nevertheless, through them, free acids may be developed on the clasp, and these in course of time may obviously greatly damage the teeth with which they come in contact.

"Electrical currents are therefore found in teeth :

"a.—When a metal plug is not of the same density throughout.

"*b.*—When two metallic fillings of different materials, or a metallic filling and a metallic clasp, come in contact.

"*c.*—When a plate is composed of different alloys.

"Another question in this connection concerns the electric conductivity of tooth substance.

"Now it is true that the ingredients of which dentine is composed are already non-conductors, but, nevertheless, I tested the conductivity (or non conductivity) of dead dentine by the following experiments. A section of dentine cutting the tubules at right angles, 3 100 millim. in thickness, was enclosed in a circuit consisting of three Siemen's cells, and the coils of a mirror galvanometer of 16,000 turns and a resistance of 5,000 Siemen's units. When the circuit was closed the mirror did not show the slightest deflection. The piece of dentine was in this experiment inclosed between the ends of two wires 1.9 millim. in diameter under a pressure of 3 gr. per square millimeter.

"This experiment was then varied by placing three similar pieces in the circuit, in such a manner that the surface of contact between the wires and the tooth-substance would be enlarged three-fold. The deviation still remained nil, showing the resistance to be infinitely great.

"When one pole of an electrical battery of four Siemen's elements is placed on a tooth filled with metal and the other pole on a second filling or on the gum, it is distinctly felt that the circuit is thereby closed. This fact has given rise to the belief that dentine is a conductor; now this, as has been shown, is not true, the apparent conductivity being due to the fluids which are contained in the dentinal fibrils, and the pulp canal. In this manner the porous cylinder of a galvanic element, naturally a non-conductor, is transformed into an excellent conductor, as soon as it becomes saturated with the battery solution; also a silk thread becomes a conductor as soon as it is moistened with a conducting liquid; so, too, a glass tooth whose canaliculi, pulp chamber, &c., are filled with a salt solution would readily transmit an electric current. We cannot on this account, however, consider these substances as conductors, they being notorious non-conductors, nor could they under any circumstances be used as one of the generating

plates in an electric cell. Through this infinite resistance of the tooth-bone every possibility of an electric current between tooth-bone and filling is excluded, just as it would be if the basis substance of the tooth were composed of any other non-conductor; for example, glass."

I also repeated Chase's experiments, using pieces of ivory as well as dentine from human teeth and from fish teeth, and filling or bringing these into contact with various stopping materials, finally allowing them to remain for a certain time in a solution of acid. I was convinced, by a series of experiments (*Dental Cosmos*, 1881, page 91), that it makes not the slightest difference in regard to the rapidity of the decrease in weight with what the pieces are filled or whether they are, in fact, filled or not.

It is simply inexplicable how Chase attained his results, particularly how he discovered that a piece of dentine stopped with oxychloride of zinc becomes negative and consequently resists the action of the acid—in other words, is not affected at all by it.

Dry tooth-bone is, like all other dry organic substances, a non-conductor, and opposes as such as infinitely great resistance to the passage of galvanic currents. Living tooth bone is, it is true, a conductor, but only in so far in that it is saturated with liquids. Tooth-bone cannot be used as one of the plates (poles) in a galvanic element any more than can a piece of clay; no current can therefore exist between tooth-bone and filling, nor can the affinity of tooth-mass for acids be either heightened or reduced by any filling.

The above applies equally well to a tin-gold plug as to that of any other metal. In the tin and gold filling the two metals are about equally distributed; this state produces on the surface of such a stopping a large number of indefinitely small electrical currents, which bring about a very intimate, and as yet not quite clearly defined, connection between the two metals, but which have no effect (theoretically as well as practically) upon the teeth.

After these introductory remarks, which I have deemed necessary to a right understanding of my discourse, I take pleasure in giving you some directions regarding the prepar-

ations of the material and of the cavities in which it is to be inserted.

#### THE PREPARATION OF MATERIAL AND OF CAVITIES.

When I wish to make a filling of tin and gold, I lay a leaf of No. 4 non-cohesive gold-foil (for this purpose I always use Abbey's) upon a leaf of No. 4 "extra tough" tin foil. These leaves I cut now into from two to four strips, according to the size of the cavity I wish to fill. For extremely large stoppings I sometimes use an entire leaf. I then twist these strips with the fingers in a loose roll, which I occasionally use whole, but generally divide into pieces of from 4 to 12 mill. in length, as the depths of the cavity requires. It is a mere matter of taste whether the tin or gold is placed on the exterior of the roll; it is not a matter of equal indifference, however, whether the tin or gold rolls are in the form of a solid rope or only a loose roll. The more compact it is, the firmer are the cut pieces and the greater the difficulty in inserting the separate bits. The tin and gold is rolled at first towards the right, until it becomes a moderately firm rope which is then unrolled towards the left, and becomes a crinkled twist. Personally, I prefer to have the tin on the outside, because it does not tear as easily as the gold foil. Dr. Jenkins, of Dresden, who has used the material for upwards of twenty years, chooses rather to have the gold on the outside, because, in his opinion, the colour of the finished stopping is, and remains, better, and moreover the cavity is better lighted during the operation by a gold than a tin surface; finally, because gold is less cohesive than tin. He prepares the material by placing an equally heavy piece of tin foil upon a leaf of non-cohesive gold foil, and pressing both leaves with the "foil crimpers" in such a manner that the gold is on the exterior. I shall not recommend any particular plan in regard to this, as it is quite immaterial whether tin or gold forms the outside of the roll. Instead of rolling the strips together, you may fold them; but in my opinion, the rolls are softer, more flexible, and easier to work. My father-in law, the late Dr. Abbot, who introduced this method of filling, always had the material prepared in rolls, and with the tin towards the surface—a practice which I follow and here recommend.



The cavity is prepared in the same way it would be were non-cohesive gold the filling material, but one can secure the retention of tin and gold in cavities where non-cohesive gold, on account of the flatness or unfavorable shape of the cavity, could not be used, much less cohesive gold. Tin-gold is also more easily contoured than non-cohesive gold.

Special retaining points are never required, and, in fact, would be quite useless.—*London Dental Record*.

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## Editorial, Etc.

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BRIDGE-WORK AND TOOTH CROWN PATENTS.—*A. L. Northrop, D. D. S., Dear Sir:*—In answer to your request on behalf of first District Dental Society of New York, asking for our opinion as to the legal position of the dental profession, with regard to the crown and bridge patents of the "International Tooth Crown Company," in view of the recent decision of Judges Wallace and Shipman, in the Richmond and Gaylord suits, and advice as to relief from further claims made under the Low bridge patent, we have to say.

These suits involved the validity of the two patents to Cassius M. Richmond, Nos. 277,941 and 277,943, for "Tooth Crowns, etc.," the patent to Alvan S. Richmond, No. 277,933, for "bridge," all dated May 22d, 1893, and the patent to James E. Low, for "method of supporting artificial teeth by bands cemented to permanent teeth," No. 238,940, dated March 15th, 1881.

The first two patents covered what is known as the "Richmond" and the "Sheffield" tooth crown in all its varieties. They were held invalid, and therefore you are at liberty to make such tooth crowns without being in any way liable to the International Tooth Crown Co.

The complainants have appealed this case to the U. S. Supreme Court, but we do not advise you that any different decision will probably result. The practical result is that the tooth crown is free.

The patent for the Richmond bridge was also held invalid but the Low patent was declared to be good. This Low patent covers a bridge attached to continuous bands cemented to adjoining permanent teeth, "whereby said artificial teeth are supported by said permanent teeth without dependence on the gum beneath."

The Richmond patent is, as you will remember, for a bridge supported by caps, and the Court held that it was not invention for Richmond to support a bridge on caps, but it was invention for Low to support a bridge on bands, taking all the surrounding circumstances into consideration, and that as a cap was nothing but a band with a roof on it, the Richmond bridge infringed the Low patent.

The practical effect of this decision, if the complainant chooses to follow it up diligently, and unless some new evidence is found, will be to shut the profession out from inserting permanent bridges supported at one or more points by cemented caps or bands without dependence on the gum.

As the matter now stands, any dentist inserting a Richmond bridge (according to the decision), infringes the Low patent; and an injunction would doubtless now be granted by any Federal Judge on application, on the strength of that adjudication alone.

An appeal can be taken by the defendants to the Supreme Court, a year or so hence, after an accounting by them, and determining the amount of profits or damages the complainant is entitled to recover.

The way of relief is for all the dentists of the United States, who supported artificial teeth on a band or bar, surrounding and extending between permanent teeth prior to September, 1878, to send to us at No. 833 Broadway, New York City, or to No. 9 Law Chambers, New Haven, Connecticut, a truthful description of what he did, and for whom, and where and when.

If such proofs can be made strong and clear enough to-

satisfy the Court that what Low described was well known, and had been long practised by dentists in the United States before Low claims to have done it, the present case might be opened for re-hearing on the newly discovered evidence—or the Court might refuse to grant injunctions, upon the ground that the present decision would have been the other way if this evidence had been before it—at any rate, the question of the validity of the Low patent would be re-tried, if its owner ever had the temerity to sue a dentist whose mouth had not been closed by a license, in which he covenanted never to deny its validity.

Whether, in a suit against such a license, the Court would enjoin upon the *covenants*, under a patent declared void, either before or after the taking of the license, we can not say.

Your obedient servants,

SOLOMON J. GORDON,

833 Broadway, New York City.

November 1st, 1887.

JOHN K. BEECH,

9 Law Chambers, New Haven, Conn.

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## Obituary.

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HUGH MCGINNIS GRANT, D. D. S.—One of the most widely known dental practitioners in the Southwest died in Abingdon, Virginia, where he had been engaged in practice for many years, December 19th, 1887.

Dr. Grant was a class-mate and the room mate of the editor of this JOURNAL, having graduated in the Baltimore College of Dental Surgery in the class of 1855.

At different times he held positions in the faculties of several dental colleges; as Demonstrator of Operative Dentistry for one term in the Baltimore College of Dental Surgery and Professor of Clinical Dentistry in the former New Orleans Dental College. Dr. Grant was also at different times Presi-

dent of the Southern Dental and of the Virginia State Dental Associations, and was a gentleman of positive traits and ideas, and very enthusiastic for the advancement of his profession.

As a student and practitioner, Dr. Grant was earnest, diligent and persevering, and stood well in his profession, being a good citizen and a kind husband and father. His death will be a sad bereavement to many friends, and be regretted by all who knew him.

Very few of the class in which he graduated survive him, and his presence will be sadly missed at the meeting of the Southern and State Dental Associations, in both of which he was a leading member.

At a meeting of the members of the dental profession of Abingdon, the following preamble and resolutions were adopted:

We, with profound sorrow and regret, learn of the death of Dr. H. M. Grant, whom, it has pleased God to remove from the world, at the zenith of his profession, and, with the highest esteem of the citizens of this community, where he has so long resided. To few men is it allotted to attain to such excellence in their chosen profession, and few have done so much to advance the interests of dentistry.

Though Dr. Grant was incessantly occupied with the cares of a large practice, yet he always found time to lend a helping hand to the Associations of the profession, seeking to guide them by the light of his experience, in their struggle along the road over which he had so successfully passed. Therefore be it

*Resolved*, That in the death of Dr. Grant, Abingdon has lost one of her valued citizens, and the dentists an illustrious exemplar and a beloved co-laborer.

*Resolved*, That we heartily tender to the bereaved family our sincere sympathy, commending them to Him whose ways are past finding out—too wise to err, too good to be unkind.

*Resolved*, That a copy of these resolutions be sent to the family, and published in the Abingdon papers.

R. T. McQUOWN, }  
J. H. MORGAN. }

December 20th, 1887.

## Monthly Summary.

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TWO CASES OF EPULIS.—*By Mr. C. Rippon, L. D. S. I.*  
—During the past six months I have had in my own practice two distinct cases of epulis, one occurring in the inferior and one in the superior maxilla. First:—Miss W——, a domestic servant, about 24 years of age, applied to me respecting the difficulty she experienced in closing her mouth properly, and particularly in masticating her food. On examining her mouth, I found that all her back teeth, upper and lower, were decayed down to the level of the gum, so that when her mouth was closed the lower incisors were pressing upon the roof of the mouth and the gums touching each other behind. Between the second bicuspid and the first molar roots (lower left side) there was a small epulis about the size of a pea, just sufficiently large enough to prevent the jaws from shutting properly; consequently during mastication, this growth frequently got squeezed and so caused her annoyance, though not very painful. In figure, the tumour was nearly round and attached by a narrow neck to the gum between the above-mentioned teeth. On the lingual aspect it very much resembled true gum, but of a bluish red colour, probably caused by the frequent squeezing between the jaws. I extracted both bicuspid and molar roots, and while removing the latter the growth and alveolus to which it was attached came away with it. I have since extracted the whole of the roots both upper and lower, and replaced them with artificial dentures, which she is now wearing with comfort, and there is no sign of a recurrence of the tumor.

Case 2.—Miss H——, age 22. In this case the patient had noticed the growth for the past ten or eleven years, and had attained a considerable size (about the size of a filbert nut); it was entirely free from pain, but disfigured the patient very much, as it was partially exposed, the lip not being able to cover it. The tumor occupied the position between the

right superior lateral and canine on the labial aspect, and in shape very much resembled fig. 81, page 161, "Salter's Dental Pathology and Surgery." The teeth were very irregular, at the same time very much decayed. The growth had all the appearances of healthy gum tissue made up into a lobular mass, and attached by a broad base extending from the mesial side of the lateral to the centre of the canine. I extracted both the lateral and canine, extirpated the growth and removed a considerable portion of the adjacent bone, the dividing wall of the socket being very friable. In a fortnight after the operation I took a cast of the mouth, which was apparently healing very rapidly. I have not seen the patient since, but have heard that she is perfectly well again and no signs of a recurrence. The operation proved very successful with cocaine, the patient only complaining of pain when the bone was being cut rather deeply.—*London Dental Record*.

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LODGMET OF A TOOTH-PLATE IN THE GULLET FOR FIFTEEN MONTHS.—*By Henry E. Bridgman, L. R. C. P.*  
*Lon.*—At 2 a. m. on April 17th, 1886, Thomas H—, aged twenty eight, was brought to my surgery. He informed me that he had gone to bed, as was his habit, wearing a small plate, to which were attached four false teeth. He awoke feeling the plate slipping in his throat, and he could, he said, still feel it at the top of his gullet. The patient was nervous and excited: he frequently retched, and expectorated blood-stained saliva; dyspnœa and dysphagia were marked. I examined the pharynx carefully with the finger, but failed to feel any foreign body. With a pair of throat forceps I seized something that I believed to be the plate, but on making an attempt to withdraw it, the dyspnœa increased, the patient struggled, and the forceps slipped. After several fruitless attempts to seize the plate a second time, I desisted, and sent my patient to the Burton-on-Trent Infirmary. There probangs were passed into the stomach without meeting with any obstruction. The patient was watched for a few days, and then discharged, the dyspnœa and dysphagia having disappeared.

I saw the man a few weeks afterwards, when he was again suffering from dyspnoea, had a hard, frequent cough, and was expectorating copiously a tenacious mucus, tinged with blood. I continued to see him from time to time until Christmas, 1886. On July 25th, 1887, he presented himself again at my surgery, bringing with him the plate with false teeth attached, saying that he had continued much in the same condition as when I had last seen him, being frequently unable to go to his work, on account of cough and difficult breathing, until July 21st, when, being rather worse than usual, he felt, after a violent fit of retching, something in the back of his throat. When, by means of his thumb-nail, he hooked out the false teeth, which he brought with him and which he had lost just fifteen months since.—*The Lancet*.

K A CASE of somewhat remarkable character, says the *Lancet*, is at the present time in the London Temperance Hospital, under the care of Dr. R. J. Lee. A girl fifteen years of age had the last molar tooth in the lower jaw on the right side removed about six weeks ago. No anæsthetic was administered. She was in perfect health at the time. Half an hour after the operation she began to yawn, and has continued to do so constantly since. One yawn succeeds another without interruption, and with an interval of two or three seconds. Galvanism had been tried without effect, and other remedies previous to admission into the hospital. Three days afterwards the yawning changed to sneezing, and recently she has suffered from constant and rapidly succeeding fits of sneezing each of which paroxysms appears to begin with a yawn. She seems to have no power of controlling herself, or only to a very slight extent; and if she attempts to do so, the next sneeze is more violent.

TREATMENT OF DIARRHŒA BY IODOFORM AND CHARCOAL — Picchini treated eight cases of diarrhœa, with symptoms of fermentations, with the following:

R	Iodoform, .....	grs. 9.
	Ether, .....	3℥.
	Vegetable charcoal, finely powered, ...	3℥.
	Glycerine, ad .....	3 12.

The iodoform must be dissolved in the ether, and the powdered charcoal thoroughly mixed. After the ether has evaporated, the glycerine should be added. To take in twenty-four hours, by teaspoonful or tablespoonful, suspended in a glass of water.—*Journal de Medicine*.

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ARTICLE I.

ON THE CURABILITY OF PULPLESS AND ABS-  
CESSED TEETH; MAINLY BY THE IM-  
MEDIATE METHOD, WITH STATI-  
STICS OF CASES.

BY GEORGE CUNNINGHAM, B. A., D. M. D., L. D. S. ENG.

[Being a Paper read before the Dental Section of the International  
Medical Congress, Washington, 1887.]

The principal work which I wish to lay before this Section, and that to which I attach the most importance, are the statistics. In presenting such a record of a large number of cases, it is possible for everyone to examine them in detail. I shall now hand round among the members copies of the actual records from which the tables are prepared, so that they may have an opportunity of examining them, and may be convinced that the figures, carefully compiled from these records, have a reliable foundation and basis. The work has proved of such a Herculean nature that I think I shall be excused for saying that I have



not exhausted all the information derivable from the tabulated records, and that the present communication might be taken as an earnest of my sincerity and interest in the investigations. The relativity of the various teeth to the condition of being pulpless or abscessed is shown by these tables, but time will not permit of my entering on that subject now. The system on which the records were kept was embraced in a paper\* I read before the American Dental Society of Europe, and has been employed for several years with success by myself and others. I should like to observe that when these cases were recorded I had not the slightest intention whatever of preparing a paper on this subject. The large detailed tabulations are simply the exact copies of the everyday record of *each* and *every* case as it came under notice. From the attention which the Immediate Method has recently received in the *Cosmos* and other American dental journals, and from the disbelief with which Dr. Craven's paper has been received, I am more glad than ever that I felt impelled to tabulate the results of this method and place it before this Section of the International Medical Congress.

The troublesomeness, the tediousness, and the disasters attending the treatment of pulpless and abscessed teeth are only too well known. The literature on the subject was so very extensive, and the views expressed so very divergent, that a perusal of it was absolutely perplexing. Peculiarly interesting and severe cases had been reported in detail; but no writer on the subject had yet given any general statistics illustrative of the results of ordinary practice. It would be only fair, however, to mention one exception, more especially as it was from the conviction carried by the clinical notes of these cases that I was induced to adopt the present line of treatment. It mainly arose out of a criticism of his book on "Dental Surgery" that Mr. A. Coleman prepared a paper which was read

\* "A Suggested System of Dental Notation for the Use of Dentists in Recording Operations." Dental Manufacturing Company, London.

before a meeting of the British Dental Association, on October 14th, 1882. It was a paper on the treatment of "dead teeth" (as he called them) by an antiseptic process. He says :—

"Such cases may be briefly described as teeth in which the whole, or nearly the whole, of the dental pulp has lost its vitality, and where the adjacent dentine, either through decomposition of the contents of the dentinal tubuli, or saturation with the septic fluids from the decomposed pulp, has become putrid and offensive, and, according to the degree of its putrescence, coupled with the state of health of the individual, more or less affects the cementum and its contiguous vascular membrane."

Mr. Coleman, in describing the process which he recommended for the generality of such cases, says :—

"After removing all the softened dentine and the contents of the pulp cavity, but not those of the fangs, and well syringing and drying, carbolic acid on cotton is placed in the pulp cavity, and left there for a few minutes, the time being generally occupied whilst preparing the filling. This latter being made ready, the carbolic acid is then removed, and the cavity again dried, and over the fine cavity or cavities, as the case may be, is placed a small disc of stout writing paper moistened with carbolic acid, on one side of which has been taken up the twentieth to the fifteenth of a grain of arsenic, this side being applied to the fang cavity. Over this zinc-oxychloride, as usually mixed for a filling, is placed as much as nearly or quite fills up the pulp cavity; and when this has set, the remainder of the cavity may be filled with any suitable filling. In the case of molars, and where it may be supposed there is any possibility of a second application of arsenic being necessary, I fill temporarily with gutta percha."

Mr. Coleman then proceeded to give the records of a certain number of cases; and it was from those cases being reported so fully that I had the confidence to adopt that operation. I must explain that my practice is in a univer-

sity town, and I have therefore a very peculiar practice—a constant succession of patients who come and then disappear. It must not be assumed that these patients necessarily went away because of the ill effects of my treatment, but because they removed to other spheres on the conclusion of their academic career. I purpose making an effort to complete the history of those cases, and to get a much fuller report as to the cases which have not been re-seen. As these proceedings will be reported in the English journals, I appeal to the profession to assist me, when possible, in filling out the history of any case I have reported, especially by sending notice of my failures. The intractable nature of many patients had led me to endeavour to get over the difficulty, especially with these troublesome students, by treatment at the one sitting; because otherwise, before the dressings had come to an end, the patient would have disappeared. I could not make up my mind to continue what I considered at best a somewhat filthy kind of practice. I was too strongly imbued with the training I had received in this country not to appreciate the fact that, contrary to what Mr. Coleman advised before I did anything I should remove the contents of the pulp canals more or less thoroughly, and that any extra expenditure of time which this operation demanded would be well repaid. The consequence was that I endeavoured to make a compromise between the two plans.

I may say that in many instances in my practice the pulp canals have never been completely filled. A certain percentage of our fellow-practitioners, as was known from their own statement, did things perfectly; but a great number did not do things perfectly. I belong to the latter category. By referring to the diagram which I have drawn upon the black board it may be seen that when I do not know to what extent the root or roots of the tooth were filled, I try to form some conception of it by means of a similar diagram in the case book. It is only in very rare cases, where the root canal is unusually patent, that I have

found it necessary to extend the cleansing process to the immediate neighbourhood of the apex of the root. All root canals which were found too small to admit a fine nerve bristle were left untouched. When we remember the frequency of curved and other irregular formations of the ends of the roots, it might be well to recognize the fact that the operative difficulties of complete removal to the very apex must often be insurmountable, and that from the danger of perforating the root at some other spot than the apex there may be a danger in over-thoroughness of excavation.

When I was on the Continent last year visiting the German dental schools, I had the opportunity of inspecting the interesting school of Leipsic under the care of Professor Hesse. We very quickly found out that each was anxious to communicate something of importance to the other, and that was as to the Immediate Treatment of teeth. Professor Hesse was carrying out that system in his school, and was doing so with success.

The present record of cases, treated by the immediate method, went back as far as the earliest part of 1883, soon after the publication of Mr. Coleman's paper. Before discussing the record, I would call your attention to one case in particular. I was going to operate for a personal friend, and having put on the rubber dam, I had just removed a zinc phosphate filling from the superior right second bicuspid, thereby exposing the putrescent pulp, and was about to clear out the carious cavity, when a very urgent message came to me from another patient. The gentleman on whom I was operating said he would take it as a favour if I would attend to the message and let him go. I did so, after removing the rubber dam, without even inserting a dressing, so you can imagine my surprise when he appeared next day with as big a face as any I have ever seen in the whole course of my professional experience. If a filling or even a dressing had been inserted, I would have ascribed this condition to the occluding and shutting up of the putrid

matter. As it could not possibly be due to that, this case seems to indicate that the sudden development of a so-called blind abscess into an acute one is not necessarily due to the occlusion of the root canal, nor to the passage of putrid *debris* beyond the apex of the root.

As my friend was an eager experimentalist, he encouraged me to carry the test of the immediate method further than I had hitherto ever dared. On Nov. 8th, 1884, the second day after the removal of the stopping, while the abscess was in this acute stage and the face much swollen, I applied the rubber dam, cleansed the cavity and root canals, inserted a minute dressing of arsenious acid and oil of cloves, and filled each root-canal with zinc oxychloride, finishing the main cavity with Ash's phosphate cement. After removing the rubber dam, the gum was lanced. The case progressed favorably, and the tooth has never given any subsequent trouble.

The various agents employed under the Dressing Method, were eucalyptus oil, the same combined with iodoform, creosote and iodoform, oil of cloves, carbolised resin, tincture of aconite, and oxychloride of zinc. I have a record of 122 teeth so treated—the majority of them (seventy four) having been treated with eucalyptus oil or with eucalyptus and iodoform. The number of extractions which I was obliged to make in those cases is six— a percentage of 4.918. I do not claim that as the total percentage of teeth extracted under the Dressing Method, because I am sure that there is a certain number of cases the further history of which has been lost, and which, no doubt, includes several extractions. But at the same time that figure, small as it is, will be sufficient for the purposes of comparison with the results of the other method. The next thing which has been noted is the number of subsequent occasions when the patient had returned, generally in the course of having other teeth treated, complaining of slight inflammation of the periosteum. This number is thirty-six, or a percentage of 29.5; while the number of

subsequent swollen faces and abscesses is thirty-two, or a percentage of 26.2. The next point of importance noted is the number of permanent stoppings inserted at the time of filling the root canals. It was found that in the years 1883-4 there were only two such out of thirty-eight cases, or a percentage of 5.26.

In the course of the Immediate Method, the first dressings employed were arsenious acid and oil of cloves. The modification of Mr. Coleman's plan, which I adopted, was simply to take the merest shred of cotton wool on a fine nerve bristle, the difficulty being to get this shred small enough. I am ready to admit that even this amount of cotton wool was a disadvantage, but I had not found anything which would do better as a vehicle. Having dipped the wool in oil of cloves, I simply touched the end with the smallest possible portion of arsenious acid, and carried it up as far as I thought it safe to go in the direction of the apex of the root. Finding that that was occasionally an unsatisfactory method in other hands, I feel that I ought to give a warning and a caution about it. I have the incomplete and careless records of one assistant, who acted as *locum tenens* for a time—an otherwise able man, who contributed to the literature of the profession, and who thought he knew all about this treatment at once. If I were to collate the extractions and the extensive necroses which followed that assistant's treatment, the members would certainly condemn this use of arsenious acid; but, in the proportions which Mr. Coleman had advised as quite permissible in the pulp cavity (a few milligrammes), the amount was so small that no deleterious results followed. It was evident that too large a proportion of arsenious acid had been used, and in several cases I found that the root had been perforated and the dressing forced beyond the opening. The results which followed were only what might have been expected from such careless and reckless manipulation. It was impossible to make out a record of the work of the *locum tenens* above referred to, as he had

failed to inscribe the necessary data, evidently thinking such a tax on his time was superfluous. In none of the cases treated by my brother or myself has there been, so far as I know, a single case of loss of a tooth due to an overdose of the arsenious acid.

Not from any failure by the employment of the first method, but in an endeavour to adopt a more exact method I next employed a solution of arsenious acid in glycerine. By careful and prolonged manipulation over a sand or water bath, I made a 1 per cent. solution, which answered, admirably, and has been very favourably commented on by several other practitioners who have used it. My brother got a chemist to make up for him a solution of arsenious acid in alcohol, with oil of cloves, which formed a 2 per cent. solution.\* After a time it was desired to test the efficacy of bichloride of mercury in this method, and, therefore, a solution of one in 1,000 had been employed in forty-five cases, and another of one in 100 in seventy-five cases. The 1 per cent. solution of arsenious acid had been employed in 165 cases. Eucalyptus oil, I am confident, would also prove efficient; while eucalyptus oil in combination with iodoform and oil of cloves had been used in a few cases. I have also tried dressings of a mouth wash, consisting of thymol, benzoic acid and tincture of eucalyptus in water, which was published as emanating from Professor Miller, of Berlin, in one or two cases.

In order to prevent possible erroneous conclusions from these facts, it may be well to state that the decision to employ the mercuric chloride in place of the arsenious acid was not arrived at from any dissatisfaction with the latter, but from a recognition of the enormously greater

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\* R

Acid, Arsenious	-	-	-	-	-	gr. ii.
Sp. Vini Rect	-	-	-	-	-	℥i.
Ol. Caryoph.	-	-	-	-	-	
Misce.						

If the arsenious acid does not dissolve at once, it will do so in time Gentle heat over a sand bath will promote solution.

power of the former over the latter as an antiseptic and germicide. Indeed, whilst I was trying the mercuric chloride, the use of arsenious acid was continued both by my brother and an assistant.

The mode of use of the mercuric chloride is very simple. After the preparation of the root canals, they are well syringed out several times with the 1 per cent. solution. During the preparation of the instruments, the zinc oxychloride and the cotton wool dressings for carrying the latter well into the root, the canals are left soaking in the solution. The excess only is then absorbed, thus leaving the walls of the canals moist, a matter of some importance, as if they are wet the zinc oxychloride will penetrate further into the finest canals than if they are dry. The addition of mercuric chloride to the first oxychloride mixed in this way is no disadvantage, but is possibly unnecessary.

In the absence of any generally recognized scientific classification of pulpless and abscessed teeth, these cases have been tabulated under three distinct conditions, viz.:

(a). Those where the pulp was removed at the time in a fairly healthy or non-putrescent condition.

(b). Those where the pulp, or what remained of it, was in a putrid state, including, therefore, all cases of so-called blind abscess.

(c). Those where a fistulous opening indicated with certainty the presence of an apical abscess.

Out of a total number of 512 teeth treated by the Immediate Method, the total number of known extractions was three. Two of these had been marked at the time before beginning the operation as "forlorn hope;" and one of them was removed partly for artificial work. The tooth was loose. My assistant had made a very pardonable mistake. It was a left superior bicuspid with that rather uncommon abnormality a bayonet-shaped root. After its extraction it was found that in drilling out the root canal the instrument had perforated the root just at the bend, and



the arsenical clove-dressing was found protruding through this perforation, thus setting up a chronic periodontitis, whether by acting as a mechanical or a chemical irritant, but not improbably as both, is uncertain. One tooth which had been extracted has not been included in this list, for the following obvious reason. On 19th November, 1884, my brother treated and filled with the arsenious acid and oil of cloves and phosphate cement a right upper lateral incisor for a lady student at Newnham College, and on 5th February, 1885, he filled the tooth permanently with gold. On the 25th June, 1886, whether by overstudy, by excess of exercise, or from what cause we know not, the hitherto absent right upper canine tooth was erupted directly over the lateral incisor. It therefore became necessary to sacrifice one tooth or the other; and it was deemed better to extract the lateral incisor. Under these circumstances it would be an error to include that extraction as coming among these cases.

The next point to which I would call your attention is the number of subsequent cases of slight periostitis calling for treatment under this immediate method. My record shows six cases as against thirty-six under the dressing method, or a percentage of 1.152, as against a percentage of 29.5. Under the Immediate Method the number of cases of swellings and abscesses treated subsequently was five, or a percentage of .976 as against thirty-two, or a percentage of 26.2. I do not ask members to take these percentages as absolutely exact; but as they were calculated from tables in which both methods had been recorded with equal faithfulness, so far as statistics went, they represented faithfully the relative advantages of these two distinct methods of treatment. There was no partiality or favour shown to the one system more than to the other. Under the dressing system in 1883-4, only two teeth out of thirty-eight, or a percentage of 5.26, had been permanently stopped at the time of filling the root canals, whereas under the immediate method in 1886-7 sixty-one teeth out of 150, or

a percentage of 40.66, had been permanently filled at once. That surely showed in the most emphatic manner the gradual conviction to which I have come to as to the results obtained by the Immediate Method in my practice. The rubber dam was recorded as having been used in 200 out of 270 cases, or in about 75 per cent. for the Immediate Treatment, and in 52 cases out of 153, or about 33 per cent. for the dressing method. In order to give some idea as to the number of cases which I have seen again, my records are not fully made up; but in one case book, out of a total of 114 cases, 70 of them had been seen again; in another, out of 109 cases, 66; and in a third, out of 49 cases, 40. I believe, therefore, that the extractions under the Immediate Method (taking into consideration the number of cases seen again, and making a liberal allowance for the patients who have consulted some other practitioner) have not exceeded 2 per cent. Making a still larger allowance for the patients in pain who have sought other advice in cases of subsequent acute periodontitis, I should say that the number was about 3 per cent., but possibly less.

The success of the operations seemed mainly to depend on the old axiom *sublata causa tollitur effectus*. No observant practitioner can have failed to notice the inherent curability of numbers of abscessed teeth. Who has not noticed the frequency of cicatricial tissue marking the existence of former fistulous tracks, even where the putrefactive contents had been allowed to remain? It was to this inherent property of spontaneous curability that we look for the relief and cure of all the injurious conditions arising from a putrescently diseased pulp. In my opinion the best mode of sterilization for infected dentine is excavation; therefore I use the nerve drill freely where the presence of micro organisms is suspected. By removing the greater part of the diseased tissue, even although the naked eye might not be able to detect the existence of any diseased process, accompanied by micro-organisms, they might fairly anticipate that the strife between diseased pro-

cesses and healthy action would come to an end. If the general condition of the individual were good, such a case would probably have a favourable termination. Is it not possible that the pathogenic functions of micro-organisms in these conditions are exaggerated? It should be remembered that many of these organisms found in the mouth and tooth cavities were non-pathogenic. Certainly, a large number, if not the majority of recorded cases, could be treated by the removal of all fairly accessible degenerated pulp tissue and infected dentine; and that, with the complete occlusion of the cavity, would result in a cure (unless there was a distant discharge of pus from the apex, or unless a fistulous track was present.)

The impossibility of diagnosing with any absolute certainty the existence of an abscess sac at the apex of the root had to be recognised. On the occlusion of the pulp canal or canals of such a tooth, a slight amount of subsequent inflammation should be regarded rather as an aid than as an obstacle in the complete removal of the existing conditions, while a more acute inflammation would ultimately promote the complete absorption and removal of any old existing inflammatory product. In a large number of cases it is probable that merely a quiescent condition is established. The pain and constitutional disturbances arising in the more severe cases of inflammation might be successfully combated by the employment of local counter irritants, and depletion, aided by aperients and the internal administration of some such drug as quinine, which possessed the power of diminishing the activity of the inflammatory process—whether by checking the activity of the cells, by diminishing the exudation, or by reason of the oxidation process, I do not know. But I can vouch for its extreme use and benefit in those conditions; and I can also vouch for the subsequent gratitude of patients (when they got into a state of despair) to the dentist for such remedy, instead of meekly yielding to the not unnatural desire for extraction.

In the majority of cases the inflammatory process was so slight as to pass unnoticed, or was not excited at all; and yet the existence of an abscess sac might be assumed as being present in many of them. In most cases it might be anticipated that either the walls of the sac adhered and became united together, or that the contents gradually dried up and became converted into a caseous mass, in which state it was absolutely innocuous and perfectly harmless, remaining where it was.

In the very small number of cases where the diseased condition persisted, resort might be had to the heroic treatment by the burring of the necrosed part of the root and alveolus, or by the injection of aromatic sulphuric acid into the diseased part. In several cases, where extensive excavations of the alveolus had occurred, it might be assumed, from their healing so rapidly, that granulation tissue had formed in the interior of the sac, followed by a gradual contraction of the newly formed tissue, converting it into a small knot of old cicatrized fibrous tissue.

I believe that the operation called rhizodontology and the insertion of a drainage tube within the tooth were unnecessary. Rhizodontology might afford a temporary and convenient relief to the patient, and (should I say it?) to the busy operator; but in several cases I have seen it result in a renewal of the abscess, or in the loss of the tooth.

Finally, no matter how much these suggestions as to the pathological conditions of pulpless and abscessed teeth and the changes produced by treatment might be subject of debate, there could be no question as to the silent eloquence of the facts showing the results of treatment as set forth in the statistics of cases which I have presented. Contrasting, then, the relative advantages of the dressing method as compared with the Immediate Method of treatment, I am led to the following conclusions:—

1st—That under the Immediate Method there were fewer extractions and failures.

2nd—That there were fewer subsequent attacks accompanied by swellings and acute abscess, and therefore the Immediate Treatment was attended with less pain.

3rd—That it required a considerably less expenditure of time on the part of both the patient and operator, the average time of treating and filling such teeth being considerably under an hour.

4th—That in consequence of these considerations, we were able to treat and were able to save more desperate cases, many of the cases mentioned in the record having large perforations of the roots, while others had been already condemned by other practitioners as utterly hopeless.

5th—That method, rather than medicine, had a good deal to do with the results, and that probably the operation would have succeeded equally well in a very large number of cases without any medicine whatever.

6th—That, from the difficulty of diagnosing such cases, it is better to conduct every operation with all antiseptic precautions.

7th—That casualties, such as perforation of the root, under the Immediate Method of Treatment, had been fewer, probably because of the less complete removal of the contents of the root canals.

Conscious, as I am, of the incompleteness of the record in some respects, I hope at some future time to complete the work, and meanwhile present a few actual tracings from my case book, some of them showing desperate cases where I scarcely anticipated success, and which I could only treat, either in justice to my patient or with satisfaction to myself, by the Immediate Method.—*The Dental Record*.

## ARTICLE II.

## SENSITIVE DENTINE.

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BY J. B. WILLMOTT, L. D. S., D. D. S., M. D. S.\*

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[Read before the Seventh and Eighth District Dental Societies, Buffalo, N. Y., October, 1887.]

The subject which I have chosen, for what I fear will prove a somewhat incomplete paper, is by no means novel, but is, nevertheless, interesting to both operator and patient. So long as a large proportion of our patrons approach our rooms with feelings akin to those experienced by the victims of the inquisition in bygone ages, we, as practitioners, will be interested in the discussion of Sensitive Dentine. On this subject so much has been said and written that I cannot hope, at best, to do more than present known facts in a somewhat new aspect, and to make some deductions, which may possibly suggest a method of combating the difficulty, more intelligent, perhaps more scientific, than some which have been in use.

Though all are agreed that human dentine is endowed with the function of sensation, there is no general agreement as to the minutia of the process by which a sense of injury is conveyed to the brain so that we may take cognizance of it.

The theory elaborated by Dr. Black, in "American Dentistry," is reasonable and accounts for the phenomena observed. In his view, experiment has demonstrated that protoplasmic cells are sensitive, and manifest their sensibility in response to contact with stimulants both chemical and mechanical. The tubules of the dentine are occupied by projections from the protoplasmic odontoblast. The central end of the elongated odontoblast is in close association with the fine nerve filaments in the periphery of the pulp.

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A fair assumption from these facts seems to be that the sense of injury experienced by the free extremity of the odonto-blasts is communicated to the nerve filaments, with which its central extremity is associated, and by these transmitted to the brain.

Whatever may be the precise *modus operandi* by which it is effected, it would seem perfectly clear, from the anatomical structure of dentine, that sensation is conveyed through, or by, the contents of the tubules, and that sensation in dentine is confined to these contents.

Though all dentine is more or less sensitive, there is a vast difference in the normal sensibility of the teeth in different individuals.

This variation is dependent on age, temperament, sex, quality of tooth tissue, and other causes, and is so great that what would be hyperæsthesia in one patient would not reach the standard of normal sensibility in another.

Ordinarily, in the discussion of the treatment of this painful condition, this fact has been overlooked. Methods of treatment which, in cases of exalted sensibility, as a pathological condition, have been entirely satisfactory, have, in apparently similar cases, proved useless and disappointing, because the condition was normal and not pathological.

Up to comparatively recent years the commonly accepted cause of hyperæsthesia of the dentine seems to have been inflammation. This theory is defended at considerable length by Dr. Taft. In the light of our present knowledge of the minute structure of dentine, as revealed by the microscope, his argument cannot be considered very conclusive. Nor has any treatment, scientifically based on the inflammatory theory, ever produced satisfactory results. Another, and more plausible suggestion, was that the dental pulp was really the seat of the exalted sensibility, and that the contents of the tubules were merely the passive instruments or agents to transmit the external impression to this central organ. Rational treatment based on this hypothesis would be the administration of such therapeutic

agents as, acting on the nervous or circulatory systems, or both, should lower this exalted sensibility. The observed result of the use of nervous or arterial sedatives for this purpose has not tended to confirm the correctness of the theory.

Dr. Louis Jack has discussed the subject in the second volume of *American Dentistry* and concludes that "it may be considered clearly established that dentinal sensibility is attributable to the state of the tubular contents, and that it is excited into extreme manifestation by some physical irritation of the fibrillæ." The doctor has only considered this sensitiveness as associated with dental caries, and attributes the physical irritation to the disintegrating process by which caries are developed. It is well known, however, that this condition is not confined to teeth affected by caries, and, consequently, is not always occasioned by the disintegration of dentine.

My own opinion, formed after considerable observation and study of the phenomena exhibited, and now expressed, not dogmatically but tentatively, is, that hypersensitive dentine as a pathological condition is analogous to the familiar condition known as "teeth on edge" and is produced by the same general cause, the irritation of an acid.

In a severe case of "teeth on edge," from eating sour fruit, the irritating acid is concentrated and abundant. It passes through the pores of the enamel, which is itself devoid of sensation, and acting on the peripheral extremities of the fibrillæ, causes such irritability in this tissue that the slightest impact on the external surface of the tooth, or any material elevation or depression of temperature, causes extreme discomfort. In the hyperæsthesia ordinarily observed in dental practice, in association with caries, the irritating acid is dilute and not in large quantity, so that the effect is produced slowly and requires for its manifestation greater variations of temperature, the contact of such irritating agents as sugar or salt, or some injury to the locality affected, as the cut of an excavator. The difference of the



two conditions is one of degree only. In the former, the irritant being applied for a short time only, and soon becoming so diluted by the saliva as to become inert, the exalted sensibility rapidly subsides. In the latter, the irritation is persistent and the hyperæsthesia becomes chronic.

We are occasionally asked to prescribe for patients whose teeth have become so excessively sensitive that the slightest variations of temperature produce acute suffering, requiring that both food and drink be taken warm. We are frequently called upon to treat cases where the necks of the teeth have become acutely sensitive to the touch of the tooth brush or other hard substance, and are especially so to contact with such chemical agents as sugar or salt or strong acids.

The first we assume to be due to an acid condition of the system generally, or a markedly vitiated state of the oral fluids; the last to be due to the acid secretions of the sub-mucous glands, probably associated with an acid condition of the saliva. If our theory be correct, antacid treatment, systemic or local, or both, should be effectual. In practice we find that the former condition, when not associated with other serious constitutional disturbance, will yield promptly to Potassium Bicarb. in tengerain doses three or four times daily. The latter is effectually relieved by the free use of precipitated or prepared chalk, rubbed into the interstices of the teeth and pasted around their necks on retiring at night, or by frequent rinsing of the mouth with lime water.

It is, however, with the treatment of sensitive dentine in caries that the dentist is principally concerned.

If we diagnose this as a pathological condition, the indications will be to gently remove as much of the debris as may be done without severe pain, neutralize any free acid with a drop of liquor ammonia, and fill temporarily with zinc phosphate, thus shutting out the irritant and permitting the exalted sensibility to subside.

If the sensitiveness, extreme though it be, is the normal

condition of the tooth, temporary filling for a month, or for a year, could not be expected to afford any relief. The fact that the average dentist is able to discriminate with a good degree of certainty between the normal and the pathological, does not bring him much comfort. What he wants is some easily available treatment that shall promptly control either or both. For this purpose the whole materia medica has been ransacked, and on one theory or another, or on no particular theory but at hap-hazard, a large proportion of the therapeutic agents known to science have at some time been recommended and tried with such indifferent success that there is still an anxious inquiry from our patients for some relief from the tortures of dental operations.

A great deal may be accomplished by gaining the confidence of the patients—by stimulating their courage—by tact and gentleness of manner and touch, by the use only of suitable and sharp instruments, skillfully and intelligently used; but even so, there is still very much to be desired. Surely science or common sense can suggest some means to this end. Referring again to the structure of living dentine, we find the tubules occupied by fibrillæ, ready instantly to communicate the fact of any injury to their extremity. If it were possible to cause these fibrillæ to draw themselves back into the tubules so that there should be a free, unoccupied portion of the tubule which could be cut off without injury to the retracted occupant, it would seem that we had accomplished our desire. Probably not entirely; as there would still remain that part of the pain due to vibration caused by the force necessarily employed in cutting dentine, this would be slight. Is it possible to secure this retraction? Agents which stimulate contraction are at once suggested. Contraction of living tissue is, however, not a condensation of bulk but merely a change of form. As the tubules are already full and the walls are unyielding, change of form so as to produce contraction is not possible. A large percentage of the contents of the tubules is water; if a portion of this could be removed, until it could be re-

placed again from the central source of supply, the cell would shrink from its free end towards its central attachment.

This is doubtless what occurs when a carious tooth has been isolated and protected by the rubber dam and the free moisture in the cavity absorbed; the natural heat of the tooth slowly evaporates the water, the fibrillæ retract and the surface can be removed with less pain than when it was moist. Here, it seems to me, we have suggested to us *dehydration* as the true secret of promptly obtunding sensitive dentine whether it be normal or pathological.

There are two principal methods by which this may be accomplished: by evaporation, and by the use of agents which have a marked affinity for water. To succeed by either method it is essential to protect the cavity from moisture, not only when the dehydration is being accomplished, but until the excavation is completed. With the advent of moisture we soon have a return of sensation and that exalted by the irritation of the previous dehydration. If we purpose to dehydrate by evaporation, a good plan will be to protect the cavity, thoroughly absorb the free moisture, remove the loose debris, then saturate the cavity with absolute alcohol, and, in a minute or two, absorb it and apply a jet of warm air by one of the appliances for that purpose. In this way the water is evaporated and the fibrillæ retracted to a greater depth than by using the warm air alone. Of the available agents having a strong affinity for water, zinc chloride has long been used as an obtunder, the effect being generally ascribed to the escharotic property. The fact that the sensation returns after a brief period would seem to contradict this theory. It is more probable that its virtue is largely due to its activity as a dehydrator. If this view be correct, Dr. Jack's direction to carefully and thoroughly wash out of the cavity the dissolved zinc chloride, would appear to be a mistake. The best results will be obtained by protecting and thoroughly drying the cavity, removing the loose debris, then introducing the zinc chlor-

ide in crystals, forcing them against the walls of the cavity. When the pain has subsided, absorb the now fluid zinc chloride and carefully exclude moisture until the cavity is prepared. Whatever agent is used the same general procedure is indicated.

A preparation consisting of equal parts by weight of absolute alcohol, anhydrous glycerine and tannic acid has been used with good success, though it is doubtful if the astringent adds anything to its virtue, that depending on its dehydrating property.

What is known as Herbst's obtunder, whether so designed or not, is evidently a combination of a dehydrator, sulphuric acid, with an anæsthetic, cocaine, with a view, doubtless, to lessening the pain of the application. Having had no experience with this remedy I cannot speak from observation as to its success. As its efficiency would seem to depend on the presence of an amount of free sulphuric acid, danger to the integrity of the tooth tissue might reasonably be apprehended. What is known as Robinson's remedy—carbolate of potassium—when properly prepared is a really efficient agent. Dr Robinson's directions were to rub together equal parts of carbolic acid in crystals and potassium hydrate. This, however, results in a powdery mass very inconvenient for use. The addition of about fifteen minims of anhydrous glycerine to each dram makes a friable solid mass which can be readily applied to the cavity. That which is sold in liquid form, however valuable in the treatment of pyorrhœa alveolaris, is not the best form for use as an obtunder of sensitive dentine. In the use of this agent the same precautions are necessary in the exclusion of moisture as have already been referred to in the use of zinc chloride.

In comparison with zinc chloride the pain of application is less severe and not so long continued. My own experience would suggest that it improves with age; the chemical combination of its constituents probably requiring a considerable time to perfect. A suggestion as to the possibly

far-reaching action of zinc chloride may be obtained by placing a drop of a strong solution in a considerable portion of white of egg. In the course of a few hours the coagulated mass will have extended to the diameter of probably an inch. A fragment of carbolate of potassium of similar size will, under similar circumstances, have converted a considerable portion of the albumen into a firm transparent jelly, possibly due to the abstraction of its water. Which agent is most dangerous to the integrity of the fibrillæ I am not prepared to say, but have a strong suspicion the former.

There are a number of other agents, such as dry chloride of lime, potassium carbonate, etc., which have an affinity for water, and might doubtless be used with some success. There are none, however, all things considered, equal to those already named.

Arsenious acid, for obtunding purposes, has been proven to be so dangerous to the vitality of the dental pulps, that it has ceased to be used for this purpose, and need not be here discussed.

To sum up—the points I have endeavored to make are:

1st. Excessively sensitive dentine may be either a normal or a pathological condition.

2d. As a pathological condition it is due to acid irritation.

3d. This irritation may be local and confined to the walls of the carious cavity, or it may be systemic and affect teeth otherwise healthy.

4th. This pathological condition from systemic causes may be effectually treated by antacids, and when from local causes, by the neutralizing of the debris in the cavity and temporary exclusion of the irritating agent.

5th. That exalted sensibility of dentine, whether normal or pathological, may be successfully combatted by intelligent dehydration.

6th. The treatment to be effectual must include the entire exclusion of moisture until the cavity is prepared.

7th. That the dehydrators with which I am familiar may be placed in the order of their utility as follows, viz:

- (a) Absolute alcohol and warm air combined.
- (b) Robinson's remedy.
- (c) Zinc chloride in crystals.
- (d) Alcohol, glycerine and tannin.

—*Dental Advertiser.*

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ARTICLE III.

FAILURE OF FILLINGS.

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BY G. S. STAPLES, D. D. S., SHERMAN, TEXAS.

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[Read before the Southern Dental Association, Old Point Comfort, Va.,  
September 1, 1887.]

Finding my name on the list of names composing your committee on operative dentistry, my first impulse was to make no attempt myself, but leave it to "the other fellow" to prepare a paper. But, as I know, we are too much in the habit of waiting for "the other fellow" in such matters. I, after reflection and through solicitation of our worthy chairman, decided to prepare a paper, whether I said anything or not.

As I made a few remarks during the discussion of the failure of fillings, at Nashville, last year, which seemed to have stirred up a "little breeze" among some of the members, and as I am satisfied my meaning was misconstrued at the time, I have selected the subject of "Failure of Fillings" for my paper.

Now, gentlemen, I do not propose to make any apologies for what I may say in this, for I have to be allowed to talk plainly, or not talk at all. I only propose to give you my own humble opinion for what it is worth; just that and nothing more. So, should I happen to hit any one on a tender spot, just clap your hands on the spot until it quits hurting, and take it in as good part as it was meant.

If there is any one subject pertaining to dentistry that I have given more thought than any other, it is the subject of failure of fillings. And I have arrived at the conclusion long since (and become more convinced of the fact every day), that more than ninety-five per cent. of failures is due to lack of thoroughness. So I propose to enumerate what I perceive to be some of the principal points of "lack of thoroughness." The first instance is the lack of thorough judgment on the part of tutors in selecting material for dentists. I believe the first, greatest and by far the most frequent cause is not, as our "Old" New Departure friends would say, due to electro-chemical incompatibility of the filling material to dentos; but rather due to electro-magnetic incompatibility between operator and patient, and positive incompatibility between the operator and his work. To repeat an oft-repeated saying (and one which none was ever truer) dentists are born, not made, and he who thinks he can take a young man, and because he has a very good education and an average amount of intelligence on general subjects, but no natural turn for dentistry, and make a first-class dentist of him, will find himself very much mistaken, and his pupil lacking in thoroughness all the way through.

Then comes a class of men who were born slipshod, raised slipshod and everything they do is slipshod, and, although they have the natural ability, the entire lack of thoroughness makes their practice almost a failure. Next comes a class of men who were born stingy, and who seem never to have cultivated any other crop through life, and so the natural result of their stinginess is lack of thoroughness in all their operations. They commence to prepare a cavity, and that they may use as little filling material as possible (especially if it be gold), they fail to thoroughly cleanse the cavity, for fear of getting it too large, and then they fail to consolidate the filling in order to economize again. And right here, gentlemen, I am sometimes afraid that this class is more numerous than most of us would like to believe.

Then comes the "all gold crank," who, because of his

lack of thoroughness in manipulating other filling materials, decides that nothing is fit to fill teeth with except gold, and so uses gold in all cases.

How often do we see splendid gold fillings in mere shells of teeth, fit monuments to attest the superior skill of the operator; but alas for the preservation of those shells, it is but a few weeks or a few months at best, until the thin walls crumble away, leaving those fine fillings standing solitary and alone, like Sherman's chimneys in Georgia. Seeing such teeth filled with gold always reminds me of a little Frenchman who used to practice dentistry in our country when I was a small boy. In those days dentistry was not the scientific profession that it is to-day (as we all know). So the Frenchman always endeavored to impress it on you that he was something more than "von leettle denteest." So, in a crowd one day, while expatiating on his own accomplishments, he remarked: "Me no leettle denteest; me von operative surgeon; me excise ze enferior maxillary von, two, tree time. Beautiful operation! beautiful operation!"

"Well, Doctor," says a bystander, "how did you succeed, and how did your patients do?"

"Oh, pye gar, ze patient dey dies, but it vas von beautiful operation! von beautiful operation!"

Just so with the "all gold crank." He would waste valuable time and material, and sacrifice the tooth, just simply for the pleasure of seeing the result of "von beautiful operation."

Then come our very best operators, and they too make failures. Then they begin to look around for the causes of failure. One will fill a tooth with cohesive gold, and it fails. Another tells him if he had used non-cohesive it would have been better, and still another would advocate amalgam, and so on; the theory advanced being that the other materials being more plastic are consequently more easily forced into all parts of the cavity than cohesive gold, and so requiring less care to manipulate them. But having failed



with them all (and it being human nature to look to everything but self for failures), he finally concludes it was the tooth at fault, and nothing would have saved it. But right there is where he makes the mistake in not going far enough with his investigations to discover the true cause of failure. I am sure that, had he gone a little further (in the great majority of cases), he would have discovered the true cause of failure to be lack of thoroughness in some part of the operation. Either the cavity was not thoroughly prepared, or in filling the plugger didn't reach every portion of the cavity, hence the natural result—failure. And right here, before closing this paper, I would call attention to one of the most fruitful causes of failure, "the retaining pit." Some of the worst failures, I believe, are caused by deep pits, severing the thin walls from all points of nourishment and thereby causing them to dry and crumble. I claim that no one can do strictly first-class work without an assistant, and with one to do the malleting, allowing me to use my left hand to hold the gold in place until I get it thoroughly anchored. I find no use for pits.

So what we want is thoroughness at every point. The thorough application of the business end of thorough dental instruments to every part of the cavity, with a thorough dentist at the other end, means success. Anything else will always result in failures. So, first be sure you understand your business, then be sure you have thorough instruments, then make thorough use of them.

When that is the case, then we will hear less complaint of failures of fillings, and less abuse of the materials used for filling teeth.—*Southern Dental Journal*.

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#### ARTICLE IV.

### CLEANING TEETH.

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Salivary calculus and stains on the teeth, at times, when the mouth is opened, will disgust the beholder, and

frequently prevents the formation of a favorable opinion of the person, who is so neglectful of his appearance. Such disfigurements are more noticeable in the mouths of women and girls than in men, on account of the absence of a beard, which often conceals the teeth of men. Nothing adds so much to personal appearance as a clean set of teeth. How necessary it is, then, that dentists should, as examples to their patients, have clean teeth. Many, however, are unmindful of the fact that cleanliness begins at the fountain head. Teaching and preaching has little effect on a careless patient unless the dentist can exhibit spotless ivories. All of the preceding is only a prelude to a few remarks on the operative procedures relative to cleansing a set of teeth for a patient. The teeth of many people, from neglect, are found more or less disfigured by salivary deposits and stains. The gums are detached at the necks, ragged on the edges and bleed easily. Pus may ooze on pressure from between the teeth and gums. Now, if a patient has from twenty-six to thirty-two teeth, all more or less covered by deposits and agglutinated mucus, food, etc., it is improbable that a dentist, be he ever so expert, could properly remove *all* extraneous matter and thoroughly cleanse a set of teeth in one sitting, even of two or three hours duration. Our own practice is to syringe the mouth with tepid water, generally adding thirty or forty drops of a ten per cent. solution of resorcin to four ounces of water. The deposits are then removed from every tooth, beginning with the third molar, coming forward to the central incisor. This is done both above and below. The deposits are all removed with a pushing motion, save in a few instances, where it is possible by the pulling movement to detach the concretion without tearing or wounding the gingival margin of the gum. It will be found, by a little practice, that this is the most effective method of operating, supposing that properly shaped instruments are used. It also saves time, produces less laceration of the gums and by consequence less interference in operating on account of the

slight loss of blood. All stains are then removed from the teeth by the use of wooden, felt, moose-hide, leather or rubber points. These should be charged with levigated pumice, powdered Arkansas stone, oxide of tin and finely prepared chalk. During the whole cleaning process the only water used in the mouth of the patient should be injected from the syringe, as it is more efficient and saves time, and the jet of water more certainly removes the fine fragments of calculus and grains of powder than ordinary rinsing with water from a goblet. Fine brushes, which are revolved by the engine, are useful in the polishing process after the calculus has been removed. *Avoid the use of mineral acids in any form for cleaning teeth.*—*The Dental Review.*

## ARTICLE V.

THE IMMEDIATE FILLING OF PULPLESS  
TEETH.

BY LOUIS OTTOFY, D. D. S., CHICAGO, ILL.

[Read before the Odontological Society of Chicago.]

Almost any novel suggestion or practice, which is at variance with established methods or principles, is at first received with diffidence and mistrust; especially if the new practice is not entirely in accord with established laws, rules or principles; hence, when the method of treating pulpless teeth at one sitting, irrespective of previous conditions, was brought to the notice of the profession, naturally the practice was pronounced by many to be irrational and unscientific, certain failure was predicted because it was entirely in opposition to well established physiological laws.

When there is any new method or process suggested, it creates immediately an idea that its application must be

universal, and some men are not prone to admit success unless the application proves universal and invariably successful.

This is true not only of immediate root-filling, but of many other practical subjects relating to our profession. Matrices, separators, implantation, bridge-work, and even crown-work, and a number of other practical methods or operations, are, by many, not considered successful because they are not universal in their application. The mind, therefore, should be freed from this impression that the practice about to be advocated in this paper is universal. Its sphere, on the contrary, is circumscribed by certain narrow limits, and whenever those limits are passed, the result is, or may be, unfavorable.

There are reasons why the immediate filling of pulpless teeth is justified in this age of steam and electricity, for one of the cardinal principles insuring the favorable consideration of any new invention or novel suggestion is found in its time or labor-saving quality, and it is principally on this ground that immediate root-filling suggests itself to the consideration of the dentist.

As it is customary with all dentists to fill immediately the roots of single-fanged pulpless teeth having an alveolar abscess connecting with the exterior, or those in which the pulp has just been devitalized and extirpated, those classes of teeth are excluded from consideration in this paper. Reference will be made only to teeth which are provided with blind abscesses, or whose periosteum is acutely inflamed, and which it has been customary to treat from two to six times prior to introducing the root-filling. The subject selected for this operation—which has been termed heroic treatment—should be (as in all cases necessitating rapid tissue reproduction, or rapid transformation from pathological to physiological conditions), healthy, robust, and usually young and active; those provided with nervous and sanguinary constitutions being preferable to ænemic, phlegmatic, and lymphatic constitutions.

Any tooth is a proper one for the operation, but free access to all roots should first be obtained, for thorough cleanliness and dryness are all-important factors. The rubber-dam should be adjusted, the *debris* entirely removed from the cavity before any attempt is made to enter the pulp-chamber, and the root canals, once opened, should never be bored or reamed, nor should any attempt be made to enlarge them; but instead, a good supply of very fine piano-wire instruments should be provided. The first step consists in saturating the entire tooth and cavity with a solution of bichloride of mercury, one part to one thousand of water; then follows the thorough cleaning of the canals with cotton wound on broaches and dipped in chloroform or ether, the object being to dissolve and remove the fats and foreign substances by the aid of these volatile agents. Only very few hairs of cotton should be used, thus preventing a pumping or forcing action toward the end of the root.

These washings should be continued assiduously until neither odor nor color is perceptible. However, in roots where the apex is very large (a fact readily determined by the experienced hand), the cotton receives a slight yellowish tinge, which does not cease, and is no bar in those cases to proceeding with the treatment.

After thorough cleaning, a solution of bichloride of mercury, one part to two hundred and fifty parts of water, is introduced into the root, but not forced beyond the apex. This having been allowed to remain two or three minutes, it is completely removed, and a weaker solution, namely, one part of the bichloride of mercury in one thousand parts of water, is forced into the root and beyond the apex. After a conscientious application of this powerful germicide, the root canal is thoroughly dried, and peroxide of hydrogen is allowed to take its place, which, also, should be pumped with a piston-shaped piece of cotton into every available space within the root and beyond it. If any pus is present, and its presence is indicated by the peroxide of hydrogen, the bichloride of mercury, one in a thousand of water,

should again be used ; but if no pus is present its use may be dispensed with. The root canals are now carefully dried with hot air, and are then again medicated by winding cotton on a broach, moistening it with eucalyptol, and dipping it into iodoform ; this is forced into the roots very thoroughly and conscientiously. While in this condition, the gutta percha dissolved in chloroform is introduced, in the usual manner. Instead of the gutta percha cones, I have been in the habit of making cones of oxyphosphate of zinc; and forcing them into the canals in a semi-hardened condition (either may be used) ; and acting as a piston, the soft gutta percha should be forced by the cone, thoroughly driving it into every space, irrespective of the fact of its passing through the apex of the root. A filling of gold (if not too large a cavity) may be immediately proceeded with. Any of the plastics may, almost invariable, be introduced at once.

The application of a counter-irritant to the gums is then indicated, which may be either a mixture of equal parts of tincture of iodine and tincture of aconite root, or an iodine paint, which is iodine dissolved in alcohol, four times the strength of the officinal preparation. In order that either may prove effective, the tissue to which it is applied must be dry. The patient is instructed to return within twenty-four hours in case of trouble. As a general rule, inflammation, sometimes quite severe, of three or four hours' duration, will follow the treatment. When a case, thus treated and filled, is successful, it does not differ in any way from a tooth treated in the usual manner ; and, I believe, the liability of recurrence of disease is not more probable than in those subjected to a prolonged course of medication. In a few of my earlier cases the treatment proved unsuccessful, the patient returning the following day with the usual symptoms accompanying the formation of alveolar abscess, but by careful observance of the principles herein laid down, general success follows the practice. While not recommending the method for universal practice,

all practitioners will find a number of cases in which it is impossible to continue, or even undertake, the treatment of a diseased tooth, or when, from any reason, the operation must be done immediately, the tooth lost or its treatment entirely abandoned; in these cases, certainly, an attempt to thus save the tooth would be entirely justified.

The following precautions should be observed, *invariably*:

1st. Do not select patients of lymphatic, ænemic, or otherwise sluggish constitutions, but robust, healthy persons. 2d. Use none but absolutely pure and reliable remedies. 3d. Perform each step faithfully, conscientiously and thoroughly before another is taken.

It requires from one-half to one and one-half hours to properly perform such treatment.—*The Dental Review*.

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#### ARTICLE VI.

### THE ETIOLOGY OF CARIES OF THE TEETH VIEWED FROM THE STANDPOINT OF PHYSIOLOGICAL CHEMISTRY.

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L. G. NOEL, M. D., D. D. S., NASHVILLE, TENN.

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[Read before the Southern Dental Association, Old Point Comfort, Va.,  
September, 1887.]

The most important topic to be considered by your Committee is the causes of caries of the teeth. This question involves all that is known of the chemistry of the fluids of the mouth and alimentary canal and of their physiological action. Its importance commands the most earnest attention, the most indefatigable zeal and profoundest research of the dental profession. Whilst we deplore the paucity of our knowledge, we may congratulate ourselves that so many brilliant minds are engaged in the work of investigation, and look forward to the dawn of a brighter day.

We shall not consume your time in recalling to your minds the researches of the advocates of the germ or fermentation theory, with the various arguments they adduce to sustain it. Nor shall we repeat here, all that has been said in rebuttal. Some recent consideration of the subject on our own part, has led us to modify our preconceived notions, and brought us to concede that the truth lies between. Some one has said, "there is a soul of truth in all error." It must needs be so. The skeleton or framework of truth, must be there, and how spaciouly we built on muscles, tendons, integuments and clothe our manikin in all the beauty of reality. If we can but show you this framework of truth in the germ theory of caries, and convince you of its existencce, we shall be content. Nor does the acceptance of it compel the relinquishment of other doctrines as ably sustained in the past; they too may be found to be builded upon a framework as enduring and strong. The labors of such earnest investigators as Dr. Geo. Watt, have not been in vain. His advocacy of the theory of the origin and action of the mineral acids in the mouth, and his clear showing of the peculiar foot-print of each, has never been refuted. We think the labors of Magitot, Miller and Watt, may be harmonized and combined into a grand whole, that shall lead us into the sunlight of the glorious day of certainty, but much labor and much patient effort lies between us and the goal. Now why should I tax your patience when I can so quickly lead you to the gist of the matter.

We have only to lift up our heads and take our eyes out of the mouth for a moment—take a little wider and more comprehensive view of nature's processes—forget we are dentists for a time, and become students of nature, to see this thing. It is a well known fact, that oftentimes, chemical agents whose affinities would lead them to combine with each other, will lie in contact for the longest time without noticing each other; they behave more like distant and reserved people at a watering place, or seashore resort,



than any thing we can liken them to. Well, what is the matter. They are only in need of a third party to introduce them to each other, and when that ceremony is performed, they buzz and hum like a bee-hive, until presto, they are pairing off and getting married. We come now to the heart of the nut. The whole story may be told in one word, and that one word is Catalysis! We have an example of this action in the diastase of fruit, which has the power of converting the starch of the fruit into glucose. We have a similar ferment ptyaline, in saliva, which produces a similar effect upon starchy foods, the glucose thus formed greatly facilitating deglutition and the function of taste. Then again, pepsin is the digestive ferment of the stomach by which albuminous matter is transformed into peptone. This ferment acts upon the food in the presence of an acid, and experiments have shown that the acid may be changed from hydro-chloric to lactic, and still the digestion of the food go on, if the pepsin be present in sufficient quantity. Its action like that of ptyaline in the saliva, is a purely catalytic one. Caries of the teeth may be likened to the digestive process. We have the lodgement of foods in the fissures, interstices, and about the gum borders on the buccal and labial surfaces of the teeth—foods capable of being transformed by the ferments and acids having access to them. The lichen like fungi, described by our microscopists as found in carious cavities, has numerous analogues elsewhere in nature, as for example, the fungi of yeast and of malt. It appears to be only a growth of the catalytic substance and whilst it does not exert a direct action itself, upon the tissues, it is the third party bringing about the mischief, by the ceremony of introduction. Take the transformation of starchy particles under consideration for a moment. Cooked starch is changed into glucose by the ptyaline of the saliva, in one minute. Glucose is the most sensitive of all saccharine substances to ferments. We can readily follow its further changes into acetic and lactic acids, and thus ac-

count for much destructive action upon the teeth. Ptyaline is powerless to produce glucose from raw starch, and it has been proven by experiments that no glucose is to be found in the mouths of herbivorous animals, accustomed to take their food raw. Nor do we find caries of the teeth, in the mouths of such animals. May this not account in some measure for the freedom from decay in the case of savages, whose food is generally taken in the raw state? We find a similar ferment in the pancreatic juice—pancreatin. Dalton calls this a diastatic ferment. Its action upon starch is much more rapid and more thorough than that of the saliva converting the whole mass rapidly into a soluble substance capable of immediate absorption. The pancreatic ferment also operates through the medium of an abid menstrum, and this acid is thought to be lactic, but it may undergo changes, as similar results have been obtained experimentally, with different mild acid solutions containing pancreatin. The pancreatic fluid possesses far greater potency for transforming starch into glucose than the saliva, converting large masses in a short time and has this power to a certain extent with raw starch as is shown by the digestion of raw starch, by the herbivora. It has other functions equally important, for it rapidly emulcifies and renders soluble the fatty matters, enabling them to get into the blood through the lacteals.

Note then the potency of acids to dissolve substances of various kinds in the presence of these catalytic agents, of which we know so little—the ferments. Note also the analogy here. We have in all these digestive or solvent processes, mild acid fluids containing a ferment. Now is it difficult to see the analogy to what occurs in the interstices between the teeth, and in the fissures of the enamel, and about the borders of the gum, anywhere in fact that food may lodge about teeth and undergo decomposition? It must be remembered that these ferments have that leavening power spoken of in the scriptures: "A little leaven leaveneth the whole lump." Once let them get established

in the mouth and it is easy to account for their action upon all alimentary substances that may be detained there long enough to undergo change. Is it difficult to conceive of these mild acids acting upon the enamel in places of habitual lodgements, and the ultimate formation of cavities of decay, with all the attendant phenomena of fungi, and need we throw out of the count such argument—such *proof* as Watt adduces of the origin of the mineral acids from decomposing alimentary substances. We know it will be said these views are not proof, they are mere reasonings, mere hypotheses. Gentlemen, this is all we claim for them, and if as such you deem them worthy of your consideration, we are content. Prof. Tyndall in his "Fragments of Science," has published an eloquent chapter on the importance of indulging and cultivating the powers of the imagination. "Without its aid, he says, we can never make progress in discovery, it must go before and blaze out through the wilderness of the unknown a pathway for the discoverer." This dim and indistinct outline will serve him as a tracer for the location of the great highway. The astronomer must first project his fancy far into the illimitable realms of space. He must first imagine the existence of a planet before he can discover and disclose it. This, gentlemen, by way of apology for these crude analogies I bring before you. Now a word as to application. You are so eminently practical you have already asked the question: "Well, what are we going to do to save our teeth from being dissolved out of our mouths, if you are going to make us digest our own teeth?" Gentlemen, why do we not digest our own stomachs and pancreas? Simply because we keep up during life too much resistling vitality. Digestion of the stomach by its own juices actually has been known to occur *after death*, when the pepsin was present in large quantity. Teeth possess but feeble vitality but this is all that stands between them and destruction. That the teeth of the ancient Gaul were better than are those of the modern Englishman or Frenchman, and that

those of the North American Indian in his savage state were better than those of the civilized inhabitants of this country to-day, is generally conceded. The reason for this is also conceded as due to the simplicity of savage life. The constant use of the teeth in masticating primitively prepared foods, the abundant nutrition furnished the osseous structures in such foods, and the beneficent effects of active outdoor exercise. Savage dentures were subjected to many of the same destructive agents that prey upon the teeth of civilized races, but they were enabled to run the gauntlet, protected by better inherent structure, and provided with a more enduring vitality. We have but to furnish sufficient and properly prepared aliment, restore to our teeth their lost function, observe proper hygiene habits and we verily believe that a race surrounded by a jealous and strict environment that would preclude the possibility of intermarriage with outside parties, might be developed up into a people possessing ideal skeletons and denture.—*Southern Dental Journal*.

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#### ARTICLE VII.

### EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY.

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BY WILLIAM ST. GEORGE ELLIOTT, M. D., D. D. S.

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I would like to say something about the principles governing the proper formation of cavities. These are general and special; the former apply to all cavities; the latter to special classes. The general principles are: First the removal of all soft decay except over the nerve in deep-seated caries. This we do mainly for physical reasons, as we cannot expect even an amalgam filling to withstand the force of mastication if it is built on a soft foundation.

When force is applied the foundation yields, and the stopping leaks as a consequence. Formerly we were taught in the text books that if we wish to preserve a tooth by stopping we must remove every trace of decay, even if in so doing we expose the nerve, otherwise the decay would perpetuate itself under the filling. Now we know that the function of a plug is the same as that of a cork in a bottle; if the cork is tight and impervious, and the neck where the cork is inserted is hard and smooth, the contents are preserved.

The second general principle is the shaping of the cavity so as to make it accessible as the stopping to be put in requires, in addition to which the interior should be so excavated as best to keep the filling in place; for example: for cohesive gold, all parts of the cavity should be accessible to the direct force applied to the plugger. Some operators take the ground that if you cannot see all parts of the cavity by direct light, it should not be filled with gold—that I believe to be incorrect teaching; but, as with all extremes; truth is found between them. Make the cavity as accessible as the occasion calls for; better to use a little hand-pressure than unnecessarily cut away the sound tooth structure; better to work in almost inaccessible places than tire out your patient by prolonged grinding; at the same time remember that fair access is essential to good work, and shortens materially the time required for filling. I have noticed that the best operators cut the teeth the most; while the reverse is also true—the poor operator is generally saving of excavation.

The cavity should be made so as to retain the stopping, except when oxyphosphate is used. All other than the white cements have little or no cohesion to the tooth itself, and merely play the part of corks, consequently you must rely upon retaining points, undercuts, or dovetails.

The third general rule is to leave the walls of the cavity as strong as possible, to remove all thin edges of enamel, grind down all projecting points, and thoroughly smooth all edges, preferably with a fine corundum point.

Fourth general rule: See when you come to close the orifice of the cavity, when cohesive gold is used, that the gold is thoroughly beaten against the edges, and to do this effectually the edges should always be at or near a right angle to the *axis of your plugger*. With amalgam this would leave the edges thin and liable to break, consequently for that material the edges of the cavity should be made at right angles to or perpendicular to the surface of the tooth.

The special principles governing the formation of cavities will be developed as we proceed.

Let us take up first, cavities between the incisors. The first special rule is to examine carefully the labial and palatine walls of the cavity; if both are strong, then enter the cavity from the front, excavate and fill. This should always be done except when there are some especial reasons, objection to the gold showing, &c., when some other course must be taken. It is remarkable how fair access to a cavity can be had through a very small opening, and unless the cavity is large the gold will hardly be perceptible. Opening the cavity in this way enables one thoroughly to remove all decay, to fill well and quickly; whereas if one has to do the work from behind, through the palatine opening, it is not only much more difficult, but is likely not to be thoroughly done. However, should the palatine wall be too thin to be kept, then open at that point, and show your skill by filling from the rear. Should both walls be poor and thin, better to remove them both than endanger your work by their subsequent breaking down. Then drill out a good pit in the cervical edge of the cavity, as you must get your principal support from this part, and get what undercut you can under the cutting edge. Some times a very good pit can be made between the plates of the enamel near the cutting edge. It is sometimes wise, as additional security, to drill a hole in the palatine aspect of the tooth, and, having cut under, connect it with the main cavity by a dove-tailed channel. Contouring the front

teeth, unless of a very partial character, I do not advise. The gold is too conspicuous. Do not let your ambition run away with your judgment. Contour work is very easy at this part, and from a technical point of view we all admire it, but our art should be conspicuous in hiding itself. If a tooth is badly broken, I prefer rather to cut it off and pivot or crown it than to use gold. If not very badly broken away, and yet very conspicuous, I would advise white cement or gutta-percha.

Anterior cavities in the canines should be filled as incisors are; but if distal they will generally have to be opened from behind, using a pit as a starting point on either side.

Between the bicuspid decay is exceedingly common. If they are mesial, they present no difficulties, as the excavation and subsequent stopping are readily done. It is advisable, however, unless the cavity is very small, to bevel or flare the opening, so that the gold will be carried well over the walls on either side and thus in a measure prevent the recurrence of decay. The crown portion should also project forward as much as the space will permit. This is called knuckling. So that the only parts in contact with the anterior tooth are at or near the cutting edge, thus preventing the crowding of food down between the teeth, a result that is sure to follow if a V-shaped space is left. You may, however, be unable to form this contour as you would wish, by reason of limited undercut; in a close articulation, stoppings that are quite well enough anchored for ordinary positions, are often bitten quite out by the great force of mastication.

When distal cavities of bicuspid occupy our attention, our principle of proceeding is quite altered. Owing to the indirect approach to the cavity, it is necessary for us to apply our force in a less direct manner. For this reason we generally use in these cases a matrix, either a thin piece of steel placed between the teeth and wedged into position; or a band matrix with a screw to draw the band into close contact with the teeth. The Ladmore-Brunton, already mentioned, answers the purpose admirably. The use of the matrix reduces the

compound to a simple cavity, for remember we have long ago abandoned the filling of a V-shaped space between the teeth to make accessible a distal cavity, instead of which we now almost invariably drill into these approximal cavities from the crown. In doing this we make a simple cavity compound, but we gain far more accessibility than we lose in other ways. Thoroughly excavating under these circumstances is easy and certain, whereas by the old way it was difficult and uncertain.

Before placing the matrix in position, the cavity should be shaped so as to get, as far as possible, direct pressure against the edges. It is practically impossible to condense gold by any other than direct pressure. You cannot do so when the walls of the cavity are parallel with the instrument, as force applied in this way rather tends to draw the gold away from than force it against the walls. To some extent we get over the difficulty by using curved or corkscrew pluggers, directing the force, as applied by the mallet, by the hand holding the plugger. Still it is always preferable to use the direct force itself rather than change the direction by the fingers.

Where it is practicable, so shape the distal cavities in bicuspid that they will be smaller across at the cervical wall than at the crown, trumpet shaped in fact. In this way you can get access and consequent solidity, but of course you have no anchorage. This you must get inside the vertical walls either by grooves, pits, or channels.

In regard to the cavities in molars, they are so various that it is hard to lay down any principle. Approximal cavities are treated as if they were bicuspid, while crown fillings present no points of difficulty.

I need not remind you that the preparation of the cavity is governed by the material subsequently to be used in filling it. For cohesive gold you merely require the anchorages necessary to hold it in position, for you can build out in any direction. For tin and gold, or soft gold, you require nearly parallel walls, malleting from the distal wall forward. For amalgam try and avoid thin edges by removing the excess of the material, and not allowing it to go beyond the parallel walls, but for the white cements or gutta-percha it is not neces-



sary to do even this. There is a class of cavities that we have not mentioned, and that calls for considerable skill in the use of cohesive gold. I allude to erosions. The disease is very common, and gold seems to meet the requirements better than any other material. My plan of procedure is as follows: excavate all soft dentine, and undercut with a drill and wheel bur all or nearly all around; do not rely upon pits. Then, having placed the rubber dam in position (thick dam with a very small hole), I keep the rubber above the gums by a sharp two-pronged instrument, then fill with crystal gold. The essential is dryness, and this is readily secured if you make but one hole in the rubber and with the silk force up folds between the teeth, so that there is an excess near the gum.—*The Dental Record*.

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## Bibliographical.

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DENTAL CHEMISTRY. THE DENTISTS' MANUAL OF SPECIAL CHEMISTRY.—By Clifford Mitchell, A. B., (Harv.) M. D. Published by the Author, Chicago, 1887.

This work is intended chiefly for students of dental colleges and attention is paid to detail and careful explanation, which are necessary to those who are commencing the study of dental chemistry. Among the authorities of the author on Physics are Ganot, Deschanelles, Miller, Gage, Avery, Barker, Bartley; on Chemistry, Bloxam, Watts, Wurtz, Gmelin, Roscoe, Allen, Long, Storer, Charles, Ralfe, Simon, Howe and others; to matters chiefly dental his authorities have been Flagg, Essig, Gorgas, Richardson, Black, Wildman, Miller, Allport, Morsman, Harlan, Talbott, A. O. Hunt, Hunter, Gilbert, Abbott, Vergne, Palmer, Brackett and others; for the use of chemical substances in dental medicine, his authority has been the work of Professor Gorgas; and the author states that he is greatly

indebted to the latter work for his choice of matter, the chemistry of which he should bring before the dental student.

The first chapter—on Physics and Chemical Physics—is intended chiefly for reference, and to explain many terms used in the body of the work.

The second chapter—on reading and writing formulæ—describes the method used by the author with his own pupils. The remaining chapters comprise compounds of non-metallic elements, of sodium, potassium, calcium, arsenic, &c., metallurgy, alloys, organic chemistry, acids, alkaloids, proteids, ferments, antiseptics, &c., the teeth, calculi and laboratory work, all rendering the volume a very valuable addition to the series of dental text books.

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MEMOIRS OF A SOUTHERN PLANTER. By Mrs. Susan Dabney Smedes. Publishers: Cushings and Bailey, Baltimore.

The signal ability of the gifted author of this volume, of 341 pages, in portraying the daily home life of the Southern Planter as it was prior to the great struggle which so changed the relations heretofore existing between master and servant in our Southern States, and which now appear as events of a past age, will be readily recognized by all conversant with the incidents of that period, on perusing this instructive and fascinating publication.

Its pages teem with scenes illustrative of southern life on the plantation, and describe the history of a true Southern gentleman, whose influence was recognized in the community of the Gulf States as that of a leader and counsellor. They also portray in simple yet impressive language, the strong ties which bound the better class of slaves to the families of their owners, and the care and anxiety manifested by the latter for the welfare of those thus entrusted to their protection by the peculiar nature of the institution which no longer exists in our land. This volume also gives a clear and correct insight into the workings of the institution of slavery in the United States concerning which so many writers have drawn distorted and unnatural pictures in attempts to produce sensational literature.

These memoirs by a Christian lady are both readable and

instructive and cannot fail to greatly interest all who peruse them, and we commend them to those who desire to understand certain events of a period, which is rapidly becoming more and more obscure amid the busy and exciting scenes of this progressive age.

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**IRREGULARITIES OF THE TEETH AND THEIR TREATMENT,** By Eugene S. Talbott, M. D., D. D. S. Publishers: P. Blakiston, Son & Co., Philadelphia, 1888.

This very comprehensive and valuable publication has been written in such a manner as to embrace a clear and practical understanding of the etiology and treatment of dental irregularities; and its contents include the Anatomy of the Maxillæ and Teeth, the physiology and description of both temporary and permanent teeth, their occlusion and position the etiology of irregularities, hereditary and acquired irregularities. Causes of irregularities, treatment of all forms, and the nature of the force necessary; and a description of the appliances best adapted for correcting the different forms of irregularities to which the teeth are subject. The style of the work is excellent, and it is embellished with one hundred and fifty-two illustrations, and will be universally recognized as a valuable addition to dental literature. The author is to be congratulated on the able manner in which he has treated a very difficult subject.

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**VICK'S FLORAL GUIDE.**—A silver lining to every cloud! With the short dull days of early winter come the cheery holidays and Vick's beautiful annual, and lo! spring already appears not far distant. We can almost see the greening grass and the blooming flowers. In the way of catalogue, Vick's Floral Guide is unequaled in artistic appearance, and the edition of each year that appears simply perfect, is surpassed the next. New and beautiful engravings, and three colored plates of flowers, vegetables, and grain, are features for the issue for 1888. Its lavender tinted cover, with original designs of most pleasing effects, will ensure it a prominent place in the

household and library. It is in itself a treatise on horticulture, and is adapted to the wants of all who are interested in the garden or house plants. It describes the rarest flowers and the choicest vegetables. If you want to know anything about the garden, see Vick's Floral Guide, price only ten cents, including a Certificate good for ten cents worth of seeds. Published by James Vick, Seedsman, Rochester, N. Y.

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**NITROUS OXIDE. ITS PROPERTIES. METHODS OF ADMINISTRATION AND EFFECTS.** By S. H. Guilford, A. M., D. D. S

Prof. Guilford has furnished a manual which will prove of great value to the student, and also to the practitioner, as it is based on practice, experience and observations in the use of nitrous oxide. Full directions for the administration of this gas, and the extraction of teeth under its influence and measures for resuscitation are given with great exactness, and render this work a necessity in the dental office. Philadelphia, 1887.

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**THE PHYSICIAN'S VISITING LIST.** 1888. Lindsay and Blakiston. Thirty-seventh year of its publication.

This concise visiting list appears for the present year in its familiar style, with much new matter added, but in such a manner as to maintain its usual size. This work answers for a dental appointment book, and is used for such a purpose by many dentists who appreciate its arrangement and durability. P. Blakiston, Son & Co., Philadelphia.

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**PEARSON'S DENTISTS' APPOINTMENT BOOK.** By R. J. Pearson, Kansas City, Mo.

This is a very convenient appointment book, of a size to be carried in the vest pocket, and arranged for appointments covering eight hours of every operating day in the year. It is very nicely bound in red Russian leather.

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**TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION,** at the Twenty-seventh Annual Meeting, held at Niagara Falls, commencing August 2d, 1887. Publishers, the S. S. White Dental Manufacturing Co., Philadelphia.

# Monthly Summary.

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**PURE MERCURY.**—In making a dental amalgam, use always pure mercury, bought from a trustworthy dealer, who knows that the article is pure. The use of impure mercury must make a poor amalgam with the very best alloy that can be obtained. Keep the mercury constantly covered with alcohol, which should remain clear, and the surface of the mercury appear brilliantly bright. Take a common glass drop-tube with bulb; compress the bulb; pass the glass nozzle through the alcohol into the mercury; release the pressure on the bulb, and the tube will fill with mercury, which may then be dropped into the hand or mortar in as small a quantity as is desired. By this method the mercury in the tube and bottle is kept from contact with the air, and will remain bright and clean until the last. If through neglect the mercury should become oxidized, wash it by shaking it in the bottle with alcohol renewed again and again until perfectly free from discoloration by the mercury. The disesteem in which amalgam are held by many dentists and patients may be in great measure chargeable to the use of impure mercury. Every dentist experienced in the construction of silver plates knows the importance of making his solder bright and clean. Similar conditions should for like reasons be observed in making a dental amalgam with mercury, which ought not only to be pure and kept clean, but for the production of the best results it ought never to be mixed with the alloy in the hand, because of the inevitable film of dermal secretions that will be spread over the surface of the mercury, and by so much hinder the perfect union of the metals. The mix ought therefore to be made in a clean rubber or vitrified mortar with a rubber or glass pestle, and the pellet compressed in a piece of washed and dried buckskin. If with these precautions care is taken to keep the alloy in a tight stoppered bottle, amalgam fillings of unwonted excellence may be made.—W. S. H.

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**CHINESE ANÆSTHETIC.**—A curious account of a Chinese anæsthetic is given *Nouv. Remedes* (April, p. 165). It appears that Dr. W. Lambuth mentions in his third annual report of the Soochow Hospital an experiment made, at the suggestion of a Chinese doctor, with this preparation. A substance resembling wax, but harder and semi-transparent, in the form of a tablet, was cut into small pieces and digested in water for twenty-four hours, together with a small white, woody excrescence. The liquid was then found by Dr. Lambuth to possess well

marked anæsthetic properties. It was found that a numbness of the lips and tongue was produced, and that the finger immersed in the solution for some minutes could then be pricked with a needle without any pain being felt. The tablet was described as being the juice of the eyes of a frog. It was probably the substance obtained by the Chinese by placing a frog in a jar containing flour and irritating the animal, when it extrudes a liquid which forms a paste with the flour. This is then dried and made into cakes bearing some resemblance to button lac. If the anæsthetic property be due to the frog's excretion, and not to the white, woody excrescence above mentioned, the facts suggests the possibility of the antihæ using the secretion to deaden the pain to which it might be subjected by its enemies.—*Extracts from Scientific American.*

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**THE CONTROL OF HEMORRHAGE.**—Dr. A. Maguire says: "In antebellum days I was called to a large plantation in my neighborhood by the manager, one of the old-time overseers, who had great confidence in his powers of healing, and was convinced of his superiority over any new-fledged *Æsculapius*, and that what he did not know of medicine was not worth knowing.

"He pointed to a ghastly looking African sitting on a veranda, with his head leaning against the brick pillar, blanched as much as his color allowed, and with a small stream of blood and saliva trickling from one corner of his mouth. He had extracted, twenty four hours before, the third molar, and the blood had never stopped. He had applied strong vinegar, Parvaz's perchloride of iron, nitrate of silver, and had caused the blacksmith of the plantation to bend and file down to a point a goodly-sized wire with which he had cauterized the socket. After doing all this he confessed he was at his wit's end. After reviving the drooping African with a square dose of whiskey, I made a wad of cotton to be compressed between his jaws, leaving a piece protruding in the mouth of sufficient size to allow the involuntary play and suction of the tongue to be exerted on it, and not disturb the formation of the clot in the socket. The hemorrhage was arrested in ten minutes.—*Pacific Record.*

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**A RECEIPT FOR MENDING BROKEN MARBLE.**—Take plaster of Paris, and soak it in a saturated solution of alum, then bake it in an oven, the same as gypsum is baked to make it plaster of Paris; after which grind the mixture to powder. It is then used as wanted, being mixed up with water like plaster and applied. It sets into a very hard composition, capable of taking a very high polish, and may be mixed with various coloring minerals to produce a cement of any color capable of imitating marble.—*Scientific American.*

**MASTICATION**—By A. W. Troost.—However easy of digestion food may be, it always profits by its stay in the mouth. Cases are on record of esophagean stricture in which patients have been kept alive by food introduced through a gastric fistula, and it has been agreed that the food agreed better with the patient. Better results were produced when the food was first masticated and then put into a tube in connection with the stomach. The dyspepsia so common among people who either do not or can not masticate, and consequently insalivate their food tells us this. Although nature has given us so modest a set of teeth, as compared with the size of our bodies, she does not intend them to be wholly disregarded with impunity. The more we use our teeth, the better for us and the better for them.—*Brit. Jour.*

**HOURS OF FATE**.—Dr. Richardson tells us that in the period between midnight and six in the morning the animal vital processes are at their lowest ebb. It is at these times that those who are enfeebled from any cause most frequently die. Physicians often consider these hours as critical, and forewarn anxious friends in respect to them. From time immemorial those who have been accustomed to wait and attend on the sick have noted the hours most anxiously, so that they have been called by our old writers "the hours of fate." In this space of time the influence of the life-giving sun has been longest withdrawn from man, and the hearts that are even the strongest beat with subdued tone. Sleep is heaviest and death is nearest to us all in "the hours of fate."

**DIFFERENCE BETWEEN CREOSOTE AND CARBOLIC ACID**.—Creosote is a distillation from wood tar, carbolic acid from tar of mineral coal; creosote is an oil, carbolic acid an alcohol; creosote is a non-crystallizable fluid, carbolic acid in its pure state, is always crystallized, except when quite warm; creosote is not soluble in water, carbolic acid is; creosote is not a caustic, carbolic acid is a powerful caustic; creosote is not a germicide, carbolic acid is.—*Mat. Med. and Phar.*

**MERCURIAL PARALYSIS**—While investigating the effects of poisoning by mercurial salts, Mr. Maurice Letulle found that in the lesions affecting the nervous substance, the myeline sheath disappears rapidly and the cylindral axis, on the contrary, persists. It seems even to persist indefinitely, and this is what explains why mercurial paralysis heals very rapidly.—*Ec.*

If all the operative dentists of a city could be prevailed upon to close their offices upon Saturday afternoons and spend the half day in the pursuit of health and pleasure, each and every one of them at the end of the year would find himself the better for it, not only physically but financially.—*Retract Editorial from Independent Practitioner.*

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ARTICLE I.

THE PATHOLOGY OF ALVEOLAR ABSCESS.

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BY E. LLOYD WILLIAMS, M. R. C. S., L. R. C. P., L. D. S. ENG.,

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(Assistant Dental Surgeon, London Dental Hospital.)

DEFINITION.

The term alveolar abscess has been used so loosely amongst dental surgeons, and its pathology so variously understood—at least, if we can gauge the latter point from observations of common practice—that it would be extremely hazardous to analyse the various opinions entertained, and attempt to strike a mean which might fairly be said to represent the average opinion. Under these circumstances, it becomes difficult to attempt a definition within limits at once exact and comprehensive. I think, however, that I shall not trespass far afield in submitting, that “alveolar abscess is a circumscribed collection of purulent material as one of the results of inflammation of the alveolar-dental periosteum commencing around the root or roots of an individual tooth.” This definition may appear



at first to be somewhat arbitrary, if not sufficient; but it has at least the merit of cutting off a variety of suppurative affections, ranging from mercurial periostitis to Riggs' disease, and should prove acceptable if only on the ground that it thus narrows down the subject within the practical limits of a short paper.

#### ETIOLOGY.

In the vast majority of cases, the cause may be distinctly traced as a sequence of the death of a pulp, and a direct spread of inflammation from the point where the vessels at the apex of the root of tooth are in immediate relation with the dental periosteum. And, inasmuch as the death of a pulp usually occurs after exposure to the external air, it is impossible in such cases to exclude the septic origin of the initial periostitis. But abscess may ensue on the death of a pulp after traumatic injury without access of air, and here the causation becomes more difficult to determine. And there is yet another form—idiopathic abscess—which is far from uncommon, where there has been neither exposure of pulp or traumatic injury, and the tooth itself is apparently sound and normal in colour. This latter condition, which is probably due to nutritive changes which are difficult to trace, was well illustrated in a mouth which I once examined, where a lady about twenty years of age had three typical sinuses apparently in connection with the sockets of three lower incisor teeth to all appearance sound and healthy. Further interest was attached to the case from the fact that the patient stated that she suffered from a similar state of the mouth for several years during the spring. The condition passed away in a short while without active interference, and did not recur up to the time I lost sight of the case.

In a tooth where pulp has died as the result of a blow, without access of air, the pulp itself may or may not be found to be in a state of putrefactive decomposition. My own experience leads me to believe that in the majority of

such cases a septic condition exists, and on this point I am compelled to differ from Mr. Charles Tomes, who brought this interesting subject before the Society some little while back. It is by no means uncommon for suppurative collections in different parts of the body to be found in a stinking condition, an analogous state of things, which is worthy of passing note, being found in cases of abscess in bone where the pus is foul and greenish in colour. The precise relation of organisms to the processes of putrefaction and fermentation is a subject which excites much variety of opinion amongst modern pathologists. Believers in Pasteur's germ theory think that these processes are induced by organisms; whilst those who object to this theory contend that putrefaction and fermentation may be initiated without the presence of bacteria, and that the organisms themselves are generated from the organic constituents dissolved in fermentable fluids. If the latter theory should prove correct, then the occurrence of putrefaction in a pulp which has broken down without being exposed to the air is but a normal pathological condition. On the other hand, if the germ theory be true, it is not difficult to believe that tissue whose vitality has become lowered, or altogether destroyed, may cease to resist the putrefactive influence of germs which, it is quite possible, may exist in normal blood, even though they be difficult of demonstration. Experiments have been made on animals by feeding them on phosphorus and thus lowering their vitality, and in these cases micrococci have been distinctly traced in the blood. That the blood under certain conditions is capable of circulating infective material is now generally accepted, as instanced in *septicæmia* and *pyæmia* and that the blood may harbour hæmatozoa has been demonstrated beyond cavil in the peculiar tropical disease known as *chyluria*.

There is another point with regard to the possibility of infection from another source, which is suggested by a statement made at the last annual meeting of the British Dental Association by the President, Mr. Brownlie, who

unhesitatingly affirmed that a tooth is not in itself watertight. I cannot personally endorse that statement; on the contrary, I believe that to be entirely erroneous, although I have not yet had the opportunity of carrying out a sufficient number of experiments to disprove the suggestion. If, however, a tooth in its normal condition does leak, another source of infection from the fluids of the mouth becomes easily conceivable.

#### VARIETIES AND CLINICAL CHARACTERS.

The principal varieties of alveolar abscess may be characterised as (1) *acute* and (2) *chronic*.

(1.) The term *acute* as applied to an abscess of any description, is indicative of an intense form of inflammation, generally dependent upon any injury whose action is short in duration and severe in character. Perhaps the commonest cause of acute alveolar abscess is a sharp attack of inflammation followed by its death. Clinically, it is characterised by an intense inflammation of the alveolo-dental membrane which extends to the adjacent alveolus and gum, and may largely infiltrate the overlying and continuous structures. The inflammatory process seems to focus itself somewhere near the point of initial injury, and the abscess generally bursts on the surface of the gum in the immediate neighbourhood of the offending tooth. In a favourable case, when the pus is evacuated either by nature or the surgeon, the inflammatory action generally subsides gradually, and resolution of the remaining products appears to take place. In a less favourable case the acute passes into the chronic stage.

(2.) *Chronic* alveolar abscess is much less intense in character, is often shown in asserting itself, and is generally consequent on the death of a pulp. It may develop with little or no pain, and often only proclaims its presence in consequence of treatment of a pulpless tooth. A limited area of inflamed tissue within the socket ultimately breaks down, and the discharge which may vary in character,

seeks the surface by way of an empty root canal or by a sinus through the overlying alveolar plate, opening by a papilla-like orifice on the gum. More rarely the pus may find vent by passing between a detached periosteum and the tooth, thus gaining the surface at the margin of the gum. An abscess of this description may go on for an indefinite time, and seems to be capable of taking on alternate periods of activity and quiescence. Chronic abscesses in other parts of the body occasionally cease to discharge when the irritation causing them terminates, and they may diminish by absorption of their fluid components—whilst the solid elements become dried up and shrunken into a putty-like mass. They may remain in this state without giving rise to any trouble, or they may again become the seat of suppuration, and form what Sir James Paget has termed “residual abscess.” A similar state of things in a modified form may happen in the mouth, and it is far from uncommon to note instances, which, I think, may be appropriately called “residual alveolar abscess.”

The area of inflammation is generally limited, but the ultimate sequelæ may be serious, involving necrosis of bone and destruction of the soft tissues; whilst the pus may eventually burrow through a track which often opens at a great distance from the socket of the errant tooth. As an instance of destructive inflammation of this kind, the specimen handed round is a good example, in which necrosis of the superior maxilla extended from the upper canine to the wisdom tooth on the same side involving the floor of the antrum, as the result of a chronic alveolar abscess in connection with the fang of the first bicuspid tooth. As an instance of the burrowing of pus from a chronic abscess, of which there was absolutely no evidence in the mouth, I may mention a case in my own practice where a canal stood out in contour on the neck of the patient about the size of a goose quill, and eventually bifurcated, each branch ending in a pouch about an inch above the clavicle, which, when full, discharged itself by ulceration of the skin.

But however interesting it might be to discuss fully the clinical aspects of the subject, it is not within the scope of the present paper; but rather to confine your further consideration to the purely pathological phenomena of ordinary cases. And, to this end, I would ask your attention exclusively to the changes which occur in the various tissues involved.

First of all, we may consider the alveolo-dental periosteum, which plays a prominent part; and, inasmuch as the changes which take place may be studied with greater facility in chronic affections, the latter type of inflammation will be taken as illustrating the various processes which I propose to examine. The membrane itself is, as you know, composed of connective tissue of a moderately dense character, and the ordinary primary stages of inflammation common to this type of tissue are in no way different from those which occur in the alveolo-dental membrane. We will, therefore, pre-suppose the infiltration of the tissue with leucocytes. This inflammatory process may end in (1) resolution, (2) organization, or (3) suppuration.

1. *Resolution*.—There is no reason to suppose that this process is uncommon in the alveolo-dental membrane, although it would, of course, be difficult to produce histological specimens—for obvious reasons. We are clinically familiar with cases of threatened abscess which disappear rapidly, where, no doubt, the primary stages of hyperæmia and infiltration do occur, only to be followed by the fortunate removal of the inflammatory products.

2. *Organisation*.—Failing resolution, the new cells with which the tissue is infiltrated become organized into a new tissue. This “productive” action is common in chronic inflammation, and is dependent on a low degree of inflammatory action. The process of organization is demonstrable to the naked eye by the palpable thickening of a membrane which often retains its attachment to a tooth when extracted, and it is under these conditions that we are enabled to study the changes that occur. On making

a section of a thickened periosteum, there are one or two things which enforce their identify upon us before making a minute examination. The first is, that the original oblique direction of the fibres is lost, and in its place the new fibrous tissues lies parallel with the root and its socket. The second is, that the intensity of the inflammatory action has been confined to the lower third (or apical portion of the membrane.) And the third is, that although the membrane may be variously affected in various degrees, yet no part entirely escapes the inflammatory action. The new tissue, if examined more minutely, will be found to be of two principal varieties. That which is more highly developed is fibroid in character; it is dense in structure, and consists of closely-packed wavy fibres in which spindle-shaped elements figure conspicuously. A less highly-developed structure consists of a loose mesh-work of adenoid character. In the early stage, some of the larger cells range themselves round, and enclose groups of smaller cells; later on, the walls become condensed and fibrillated. This latter tissue is constantly present in low inflammatory conditions, and is often associated with teeth which are the subjects of periosteal irritation whilst their pulps are still in a healthy condition.

With regard to the degeneration which may occur, one would naturally look for a fatty change; but although this is quite possible, I have been unable to trace a single instance of fatty degeneration. Caseous degeneration is not common, but I have come across evidences of it in a few specimens.

3. *Suppuration*.—When the inflammation is intense or prolonged, the leucocytes accumulate in sufficient numbers to form pus, at the expenses of entirely destroying the tissue at that spot. This is what has already been referred to as the “breaking down” of tissue. The old idea of an alveolar abscess—and one still tenderly nursed—was that a pyogenic membrane was formed which had a special function of secreting pus, the latter denuding the fang

extensively. Even now the enlarged periosteum often clinging to an extracted root is looked upon as the wall of an "abscess sac," and this wall is mysteriously connected with any purulent discharge in the neighbourhood. We all know how a chronic alveolar abscess may take on active inflammatory action with the result of a large accumulation of pus, but, as a rule, the action is of a low type, and the area of tissue broken down is comparatively small. I am compelled to disagree with the usual account given in text books about the denudation of fangs which are supposed to be bathed in pus as a regular thing. In extreme cases where the hard tissues are undoubtedly necrosed (in the true sense of the word) the fangs will of course be in actual contact and be largely denuded; but that this is a common factor in ordinary cases I deny altogether. Pus is supposed to be endowed with the power of absorbing the tissues with which it comes in contact, and by virtue of this power it has been considered the chief factor in the absorption of roots. I believe, however, that the latter is due to another agency altogether, which will be considered presently. The nature of the discharge from an alveolar abscess varies in character from what is known as laudable "pus" to a thin sanious exudation. It has a strange phosphatic odour peculiar to itself, which cannot be accounted for, as far as I am aware, any more than the peculiar odour of sweat in acute rheumatism; like it, however, it has its own diagnostic value. There is one point in connection with alveolar suppuration which becomes important clinically, and that is, that no pronounced inflammatory discharge from a periosteum can be detected, except the pulp in connection with it be completely broken down. A local suppurative periostitis, such as I have described, may be altered in character and develop into a serous cyst with a thin papery bony wall; and in several of these cases of maxillary cyst I have been enabled to distinctly trace the history of alveolar abscess.

## CHANGES IN CEMENTUM.

The phenomena of absorption and addition to the surface of cementum are present in a marked degree in connection with chronic alveolar abscess. The latter condition has been described as exostosis, hyperostosis, and hypertrophied cementum. The last term is incorrect, for hypertrophy only occurs in connection with the increased functional activity of a part; the two first are misleading. In lieu of something better, I would suggest the term "cementosis," which is more expressive of what actually takes place. Absorption and cementosis may go on separately, synchronously, or alternately in the same root; and it seems quite impossible to decide upon the exact factors which determine and govern the various processes. As a broad general rule, I think it may be stated that a slight degree of irritation may produce cementosis, whilst absorption will depend upon more active inflammatory action.

1. *Absorption*.—As already stated, absorption of a root may proceed in a most erratic fashion, and inasmuch as a deposit of cementum may be taking place at the same time in the same specimen, it becomes somewhat difficult to trace the process. It is an easy matter to examine an inflamed periosteum in a comparatively fresh condition, but, unless the corresponding surface of the tooth be also observed at the same time under the microscope, we are apt to imagine a local condition which may not possibly exist. The various diagrammatic drawings which we see scattered about in popular works are only too often testimonies to vivid imagination rather than to truthful observation. If we want to find out what really does take place in the pathological absorption of the root, a section must be cut of both root and membrane, so that their exact relationship may be observed. This entails prolonged manipulation, which cannot but be prejudicial to the soft tissues; hence the difficulty by which we are handicapped. Nevertheless, a good deal may be grasped, and the details



supplied may be supplemented by fair inference. There is one fact that obtrudes itself upon anyone who has studied the microscopic appearances of absorption of teeth, and is,—that pus has little or nothing to do with the immediate process. The surface of the hard tissue presents numerous absorption facets, forming on section segments of irregular circles, and in favourable specimens the individual facets are seen to contain large protoplasmic masses with a great number of nuclei; these giant cells are backed up by cells similar in character but smaller in size, whilst beyond they imperceptibly graduate into ordinary leucocytes, supported by a fibrous stroma; and the direction of the fibres is worthy of note, as being in the direction of the absorption cells, and often at right angles to the fibrous tissue surrounding the root. That these cells are recruited from the leucocytes there can be no doubt, but what the nature of their solvent action is, remains at present a riddle.

2. *Cementosis* is the result of a low inflammation, as instanced in the case of teeth which cannot be detected as unhealthy in the mouth, whilst absorption is undoubtedly the result of a higher inflammatory action. The processes are, therefore, dependent upon local nutritive conditions of the alveolo-dental membrane, and variations of these conditions must account for the variation of the processes. The varieties of cementum deposited may be grouped into four divisions:—(1) Granular, (2) Laminar, (3) Lacunar, (4) Irregular. All of these varieties may be found in cementosis as the result of chronic thickening of the periosteum in a single specimen. In the normal cementum covering ordinary teeth, where the tissue is thin, it will be found faintly granular and almost structureless, whilst in positions where it is thick we have lacunæ and canaliculi pretty regularly distributed. The cementum found in conical molars where the fangs are glued together will generally be found to be of the granular variety. The laminar variety stains deeply, and looks as if wavy fibres running parallel with the surface of the root had become

calcified; it is common in cementum covering the roots of teeth which have been slightly inflamed—as in the case of teeth with healthy pulps. Lacunar cementum is not found in large quantities on roots which have been the subject of tolerable intense inflammation, but occurs in isolated patches, and the lacunæ and canaliculi are irregularly distributed. The irregular variety, on the contrary, does appear in these cases, and suggests the calcification of a jumbled mass. Both this variety and the granular have faint linear markings. I am unable to find out what variety of circumstances regulate the type of tissue formed, or to discover how the cell-elements differ either in size or arrangement in producing the different varieties. It has been suggested that the genetic cells (osteoblasts) are in no way to be distinguished from absorption cells (osteoclasts,) but I think they may be distinctly differentiated. In the first place, they are distinctly smaller than the giant absorption cells; and in the second place, they are supported by a tissue whose fibres generally run parallel with the surface of the root. Should, however, the fibres happen to deviate from this general direction, the linear marking will correspond with such deviation.

#### CHANGES IN THE ALVEOLUS.

The bone lying in immediate contact with an inflamed dental periosteum is liable to become absorbed, and a specialised tissue performs this process in a precisely similar manner to that which obtains in the absorption of cementum. The space thus gained is filled with granulation tissue, and the inflammation may eventually cut off the vascular supply of a portion of bone, which then becomes necrosed. The medullary tissue, with which the alveolus may become riddled, cannot be distinguished in any way from the continuous tissue surrounding an inflamed root.

#### CHANGES IN DENTINE.

There has been, and there still exists, a great conflict of opinion as to whether “vital action” occurs in dentine,

and whether strictly pathological conditions may be observed in this tissue apart from any changes which can be accounted for by purely chemical action. The question has arrived at its acutest stage in discussing the phenomena of caries, but as caries and alveolar abscess have no intimate relation the one to the other, I intend giving the former a wide berth. It will at least be a slight novelty—if of less interest—to enquire if any changes occur in dentine as the result of periostitis; and if so, whether they may be considered as pathological. It has been commonly noted that the dentine of the roots of teeth in old people has a peculiar horny, translucent appearance, quite distinct from the ordinary characteristic opacity of ordinary teeth; and this is also true of the roots of teeth exposed to long periosteal mischief. If the latter be carefully examined in section, there appears to the naked eye a distinct outer belt of tissue more apparent than the rest of the dentine, and less susceptible to staining. The microscopic appearances confirm the existence of this transparent belt, and one naturally seeks for an explanation. In trying to account for the “transparent zone” in connection with caries, several theories have been advanced to explain a condition which appears to be allied to that under consideration. The simplest way of explaining the increased transparency is to ascribe it to calcification of the dentinal fibrils, and this is the ground taken up by Dr. Magitot. Leber and Rottenstein take up the direct negative, and say that the transparency is due to decalcification. Professor Wedl seems inclined to deny the theory of calcification, and says he has succeeded in staining the tubes and their contents of the transparent teeth of old people with carmine. Other workers have experimented in this direction, but time will not permit of an analysis of their opinions. Mr. Charles Tomes, to whom we are indebted for so much research in the field of dental pathology, appears to disfavor the idea of vital action in dentine—at least, that is the impression conveyed by a careful perusal of his latest account of

caries. I am afraid my own experiments are so slight as scarcely to justify the expression of an opinion, and yet I am unable to account for the transparent belt of dentine in fangs which have been involved in periosteal inflammation without assuming a process of a low inflammatory nature. In the first place, it has yet to be proved that the tissue is incapable of pathological changes *per se*; the fact that it is non-vascular is of itself not sufficient, and on *a priori* grounds we are justified in assuming that any tissue, if it be alive, is capable of exhibiting inflammatory action. From a large number of sections which I have made, there appears to be a distinct increase of medullary tissue in the shape of enlarged tubes and their contents, which is more marked as it recedes from the area of irritation in the direction of the pulp canal. And this is further explained by its liability to deep staining, a phenomenon which is a characteristic feature of inflammatory material. On the other hand, the transparent belt already referred to in immediate continuity with the cementum certainly gives evidence of calcification as a sequence of inflammatory action; it may be noted that the increased transparency of the tissue may be differentiated from the dentine nearer the pulp canal even after the tooth has been softened in acid for the purpose of section cutting. In fact, the process seems to be somewhat analagous to sclerosis of bone, varying in degree rather than in type. It has been generally assumed, in the words of Mr. Charles Tomes, that the vitality of the dentine is sacrificed when the pulp is destroyed; and we have been in the habit of speaking of a pulpless tooth as a *dead tooth*. I cannot subscribe to this formula, because I believe that death of the dentine does not necessarily follow death of the pulp. I think I may assert, without fear of contradiction, that in the whole range of human pathology not one instance could be found of new living material being deposited on dead tissue. Yet this is true if death of the dentine follows death of the pulp, as the deposition of cementum to repair absorbed patches of

dentine in pulpless teeth may be easily **demonstrated**. One of the specimens under the microscope clearly shows this, and is taken from one of the fangs of a lower molar which had been treated for alveolar abscess unsuccessfully for a long period. This last indication of vital action in dentine is one which appears to me to be convincing; and I would particularly invite those members of the Society who are skeptical of anything in the shape of a pathological condition of dentine—and they must be in a large majority—to discuss this particular point, and try and account for such a strange phenomenon.—*Dental Record*.

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## ARTICLE II.

### A VERY VALUABLE LESSON FOR THOSE WHO USE ANÆSTHETICS. \*

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MARYLAND.

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R. A.—, a robust, healthy child, three years of age, was recently brought to me with a cancerous left eye. The attention of the parents was first called to the yellow appearance of the pupil eighteen months before. The gliomatous mass filled the vitreous cavity, distending the pupil, and obliterating the anterior chamber. The eye was injected and painful. The prompt removal of the eyeball was urged as the only means of protecting the child from a painful death. The operation was accepted by the parents, and the enucleation, under chloroform, accomplished after much difficulty, as the sequel will show.

The child was suffering from a bronchial trouble, but that was not deemed an obstacle to the administration of an anæsthetic. The patient was placed on the operating

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\* Paper read before the Baltimore Academy of Medicine.

table, his clothing loosened about the neck and chest, and chloroform was inhaled from a towel, folded in conical form, with open top. Deep sleep was soon induced.

When the anæsthesia was complete, the operation for the removal of the diseased eye was commenced. The conjunctiva was divided around the cornea, and the tendon of the external rectus muscle was being sought for, when respiration suddenly ceased. The face assumed a death-like pallor, the pulse disappearing at the same time from the wrist. Immediately the child was suspended by the feet, with body and head hanging down at an inclination of seventy degrees, while an assistant volunteered chest-compression for artificial respiration. After a few minutes signs of a feeble respiratory movement were noticed, a slight throbbing of the neck vessels was detected, and in time the child evinced its return to consciousness by crying.

He was laid on the table, but would not permit the eye to be touched without a twist of the head, evincing great irritability or sensitiveness of the conjunctiva. As the operation had to be completed, I ordered chloroform to be again administered. Chloroform narcosis was very soon re-established, but before I had time to resume the operation the child again stopped breathing and the pulse disappeared. The body, apparently, of a dead child, was once more hung up by the feet, so as to allow blood to gravitate toward the anæmic head and brain, but with no further attempts at artificial respiration. Myself and four assistants watched anxiously the pale face, to catch the first evidence of returning vitality. After some minutes I noticed that the large vessels at the root of the neck showed some fulness, then a slight thrill, and after this the first attempt at a thoracic movement appeared. In ten minutes breathing was sufficiently strong to allow the child to cry again, much to the relief of all of us.

Still, the operation which was so imperatively called for, for the future safety of the child—even the saving of

its life from the ravages of cancer—was uncompleted. While the father and mother, both present in the operating room, were pleading for their child, they were made aware, by the restlessness of the patient when the eye was touched, that nothing could be done without the child going again to sleep, so I once more ordered the inhalation of chloroform. For the third time chloroform narcosis was promptly established, and was followed very soon afterward by suspended respiration and the disappearance of the pulse. Death now seemed to be complete. Immediately the child was hung up by the feet. The absolute quiet of the operating room was broken only by the lamentations of the parents. All eyes watched the face of the child. Five minutes seemed an hour, and the ashy lips showed, so far, no response. Soon after this a faint effort at respiration was observed, which became stronger with each return of the thoracic movements, and the pulse was again felt feebly at the wrist. When respiration seemed established, insensibility continuing, I had the child laid upon the operating table. As soon as the body assumed the horizontal position, the pulse, not yet strong, disappeared from the wrist, and the respiration ceased, necessitating at once a renewal of the suspension. This curious phenomenon of breathing when suspended, and becoming inanimate when the prone position was too early assumed, was repeated two or three times, respectively. For safety—for I was afraid to lay the child down—I was forced to enucleate the eye while the child was suspended with head downward, an awkward position for operating. It was some time, fully a quarter of an hour, after the operation was completed and the eye bandaged, before I could trust the child in the recumbent posture.

One of my assistants was very anxious to have whiskey injected, and had filled his hypodermic syringe for that purpose; but I declined its use, trusting to inversion alone for resuscitation. The final successful issue of this case confirmed my faith in this invaluable method, which I

had used successfully on former occasions, and hence confided in it for the protection of the patient through the trying ordeal. In all, the child must have been suspended in the inverted position for fully three-quarters of an hour. After the last suspension no further trouble ensued. The next day the child was so thoroughly himself that he left the hospital with his parents. He was brought back to the dispensary for inspection, two days afterward, a picture of health.

This case cannot be too carefully studied by surgeons who must continue to use general anæsthetics. It is one of a series occurring to me now and then—I am glad to say, at long intervals—as the consequence of chloroform inhalation.

I am a strong advocate of chloroform, believing it to be the most available remedy of this class. I recognize it as a powerful agent for evil, but at the same time I believe it to be the best of the general anæsthetics. In army life and in civil practice I have had a personal experience of at least ten thousand administrations, and without a death. For thirty years I have had charge of a surgeon hospital service, and my daily use of chloroform has been the subject of public professional observation. Sulphuric ether I have seldom used—not one hundred times in my life, and in most of these instances only to exhibit on patients the effects of the various anæsthetics in medical classes at the University of Maryland Hospital Clinic. In the last ten years I have not used it once. For painful operations of very short duration I use the bromide of ethyl, and for all others I use chloroform exclusively.

At the Presbyterian Eye and Ear Charity Hospital of Baltimore City, in which institution I am surgeon-in-chief, I have used chloroform as often as nine times in one day. The consumption of chloroform in this hospital is computed at hundreds of pounds. A pound of sulphuric ether has never been purchased among the hospital drugs, and it is not administered in the hospital.



My rule of practice has always been to do surgical work with the least possible pain, and to refuse anæsthetics to no surgical patient. In the administration of chloroform certain rules are followed. All clothing must be loose around the neck and chest. With adults, an ounce of whiskey is given in advance. In the case of persons under thirty years of age this cardiac stimulant is omitted, unless the patient be feeble. In this hospital practice no precautions as to eating can be observed. The clinic is held at two o'clock every day. Patients are frequently sent from the dispensary to the operating room one hour after they have eaten a hearty meal. If the patient has been admitted into the hospital wards the day before operation, his dinner is withheld.

Chloroform is administered with the patient lying on his back, and as soon as narcosis is induced the pillow is taken from under his head, so that he lies in an absolutely horizontal position. Should snoring occur, indicating some difficulty in pharyngeal breathing, the chin is drawn forcibly upward. This elevation pulls the anterior wall of the pharynx, with the hyoid bone and root of tongue, forward, making for the air a clear and straight passage from the nose into the lungs. By this movement of the chin respiration becomes immediately quiet and easy. The pulling up of the chin is a much more efficient and convenient means of pulling the root of the tongue forward than by pulling out the tongue with a forceps, as is recommended by some surgeons. It is not always easy at this stage of anæsthesia to get into the mouth, as the lower jaw muscles may not be relaxed. A proper tongue forceps is not often at hand, and to tear the tongue substance with sharp-toothed and yet slipping instruments, with the soreness and swelling which subsequently follow, is an abominable practice that should be abolished. The patient's chin and your own hands are always present, and it only needs knowledge of the method to apply it, and to secure prompt and speedy relief.

The instrument used for the inhalation is a towel folded in cone form, with the apex of the cone open, so as to permit air to mingle freely with the chloroform vapor. During the administration the face is closely watched by the surgeon. If the ears remain pink, the heart and lungs must work properly; therefore, there is no need for feeling the pulse. Any failure on the part of either of these organs can be seen in the change of the complexion more quickly than it can be felt at the wrist. When the conjunctiva is no longer sensitive, the patient is considered thoroughly anæsthetized, and the administration of chloroform is stopped. In eye work the chloroform administrator must now get out of the way for the surgeon, and therefore the administration of anæsthetic cannot be injuriously continued. Herein lies one great point of safety with the ophthalmic surgeon.

As I have previously stated, I deny chloroform to no surgical patient. Prior to the discovery of cocaine as a local anæsthetic, I administered chloroform for cataract extractions, enucleations, iridectomies, squints, lid operations, passing of lachrymal proopes, or, in fact, any painful operation whatever, and even for the examination of irritable eyes in children. These patients were of all ages, from infants to octogenarians, and of course represented every condition of disease and health. If restoration to sight could be obtained, operations were performed on the blind regardless of the diseased conditions of other organs. Some patients were strong, and some were very feeble, with lung, heart, and kidney diseases. No pathological lesion in any other part of the body deters me from the use of chloroform should an eye operation be required.

Cataract patients are usually old; most frequently they exhibit decided senile changes. I suppose an average of sixty years of age would represent this class of patients; seventy, seventy-five, to even eighty-five, ninety, and ninety-five, are at times the respective ages; ninety-six is the extreme age at which a successful cataract extraction has

been performed under chloroform at the hospital. It is well known that fatty hearts are very frequently found in old subjects in dissecting rooms. My cataract operations now reach fifteen hundred. Of these, many must have had fatty hearts. Prior to the last two years, before cocaine came into use as a local anæsthetic, I gave chloroform in all cataract cases, and therefore must have given it to many patients with fatty hearts.

Very feeble heart pulsation, with irregularity of action, I frequently met with in old patients. With such I always increased the amount of whisky, which I administer in advance of the chloroform inhalation. I consider it much the safer practice to put whiskey into the stomach, where it is ready for use, if wanted, and where it can do no harm if not needed. I have never had occasion to inject whiskey or ether into the rectum or under the skin. The hypodermic syringe forms no part of my chloroforming apparatus.

So far, after thirty years of active surgical life, I can conscientiously say that in no single case have I had cause to regret that I chose chloroform as the anæsthetic. I always give chloroform in the presence of physicians—never alone—and most frequently with the whole surgical staff of the hospital present. Had death from chloroform occurred in my practice, it would have received, necessarily, prompt publicity. That I have never had one, and that I have never refused chloroform to any patient received into the hospital for surgical treatment, is a fact well known.

I repeat, that in my long experience I have never had a death from any anæsthetic, although I have given chloroform to over ten thousand persons of varied sanitary conditions; but I freely acknowledge that I have come very near having a fatal ending more than once. I have had four cases of sudden arrest of respiration, with failure of the heart's action, when death would have inevitably been the final result had not prompt and proper means been taken to resuscitate the patient.

Experience under these severe trials has made me a firm believer in the efficacy of inverted suspension for the restoration of life in patients apparently killed by chloroform. I feel convinced, from my own experience with this invaluable method, that many of the dead from chloroform might have been resuscitated had the surgeon hung up immediately by the feet the inanimate body, instead of wasting time in applying hypodermic injections, cold water splashings, spanking, fanning, electricity, or even attempts at artificial respiration, the remedies which text books on surgery recommend. Do any or all of these things if you will, but hang up the patient first, and that instantly, as soon as the heart and lungs fail. It is the horizontal position that is fatal in chloroform poisoning, and leads to death if the body is kept in it, as all the reports of fatal cases with chloroform show.

With myself it has become a matter of faith, and in suspension alone I now place my confidence. So far it has served me most successfully. Had I not used suspension in the four cases referred to, most of them, probably all of them, would have died. Then my percentage of fatal cases would have corresponded with the average chloroform mortality; one in twenty-five hundred cases of administration.

By suspended respiration I refer to the complete arrest of all respiratory movements. I do not mean that very feeble state of heart and lung action, accompanied by pallor of face, which frightens so many physicians, and which I know only foreshadows the approaching vomiting. This condition of depression I see with a great many chloroform patients. With me it is only a signal that a basin should be in readiness. I often hear physicians, in giving their experiences, speak of their very narrow escape from a fatal chloroform administration, meaning this stage of depression which one familiar with chloroform, from its daily administration, would almost call normal.

Many years ago I became very much impressed by

certain experiments made by Dr. Nelaton—that well known French surgeon—to show that in chloroform narcosis the respiratory and cardiac centres were weakened by an anæmic condition of the nervous apparatus, the exposed brains of animals bleaching as chloroform vapor was inhaled by them to complete anæsthesia. When this whitened appearance indicated such a condition as to give but little of the blood-stimulus to the great nerve centres, their functions ceased in a regular order: First in volition, next in voluntary movement, then in general sensation, and finally in the arrest of involuntary or organic movements, including the action of the heart and lungs, and then death promptly ensued. In his experiments he found that when a number of rats had been thoroughly narcotized with chloroform, those which he would immediately hang up by the tail would slowly revive, while those left supine on the table died. If, when animation commenced to show itself in the hung up animal, the rat was laid down too soon, breathing would again cease, and the rat would die, unless immediately suspended, when the respiratory and cardiac actions would be resumed. It was only after a sufficiently long suspension, giving the brain and heart ample time to have supplied to them, by gravity, a desired amount of blood, that death could be prevented. If the animal was not already dead, suspension alone would restore animation. The knowledge of this fact is daily put into use by vivisectionists in their experiments upon animals under chloroform. The case of the child which I have reported is really in the line of these experiments, and clearly shows the danger of the horizontal position when the heart and lungs fail. The suspending of the human body by the feet to restore animation in chloroform poisoning was Nelaton's great discovery, and is known as his method of restoring patients to life when, under chloroform anæsthesia, respiration has suddenly ceased. The knowledge of, and faith in, this method, has served me well on many trying occasions. To it alone I attribute my clean record of over ten thousand cases of general anæsthesia and no death.

Eighteen months since I ordered chloroform to be administered to a patient, eighty years of age, who had his right ear a mass of epithelioma. The pinna was much enlarged and an offensive, painful ulcer, with ragged outlines, covered nearly the whole surface. The object of the operation was to remove all of this fetid, discharging surface, and to close as much of the wound as possible, by quick union. His history, as given by himself, was quite a curious one of coincidences. He had been married twice. His first wife had a cancer of the breast, for which an operation had been recommended by his family physician. She died under chloroform before any incisions were made. His second wife was brought to me six years ago, suffering from a malignant disease of the socket, involving the eyeball, the eyelids, and skin of cheek. The cervical glands at angle of jaw were secondarily infected. I declined to operate, and advised against it, as no good could possibly come from it. She returned, disappointed, to her distant home. Against my advice, the local physicians urged the operation, and in her anxiety to get rid of the cancer, she yielded to their solicitations. They undertook it, and she died during the operation—they said, from the effects of chloroform. There were no blood relationship between himself and either of his two wives, and yet he also had a cancer for which an operation under chloroform had been advised. He was of a robust frame, although eighty years of age. In his desire to get rid of the fetid discharge, he submitted without hesitation to the course recommended.

First a full dose of whiskey was taken, and then chloroform was administered by the resident physician of the hospital, aided by the medical staff. I had left the operating room for a few minutes, to show to a medical visitor some case of interest in the wards, when the nurse ran to inform me that the man whom I had just left was dead. I hastened with my medical friend to the operating room. I found one of the physicians trying thoracic compression for artificial respiration on an apparently lifeless

body, lying flat upon the operating table. I had this immediately stopped, and under instructions the four doctors present, with the nurse and the brother of the patient, held up the lower end of the operating table so as to incline the body and head at an angle of over forty five degrees, using at the same time all of their restraining force to keep the body from sliding off the table. Nothing else was done. With the inanimate body in the way suspended, we quietly and anxiously awaited results. In a very few minutes we had the satisfaction of seeing slight thoracic movements, then the ashy, livid face lost its death-like hue. When respiration became fully re-established, the table was lowered and the operation safely completed, no more chloroform being required in this case.

A *third case* occurred in my hospital experience eight years ago. It was that of a woman, forty-five years of age, who had suffered frightfully from repeated attacks of iridocyclitis. I had urged an iridectomy as a means of protection from suffering, but on account of timidity she had steadily refused to submit to it. After many sleepless nights of agony, and being worn out by the pain, she finally consented to be operated upon. Loss of sleep and the constant pain had enfeebled her very much. She was given two ounces of whiskey before being put on the operating table. Complete anæsthesia under chloroform was soon induced. The eye-speculum was being placed in position, when respiration suddenly ceased. No one was feeling the pulse, as I was standing over the face, watching the skin-circulation. She looked dead, and we thought her so. Fortunately, there were several physicians present, and immediately she was hung up by the feet. While I watched the effects of suspension on the face, more attempts were made, by rythmical abdominal pressure, to force air from the lungs and thereby excite a respiratory movement. This, however, was soon desisted from, being inconvenient, and, as I thought, useless. After a few minutes of suspension, respiration was gradually re-established.

The patient, brought back to life, was again laid upon the operating table. She was perfectly relaxed, and I hoped that I could do the iridectomy without any further anæsthesia. The moment I touched the eye a flint of the head exhibited a degree of irritability, showing very plainly that it was impossible to attempt it. As the pulse by this time seemed perfectly re-established, and the stomach contained a good quantity of whiskey (there had been no vomiting), I determined again to give her chloroform. A very few whiffs from the charged towel brought on full anæsthesia, and with every promise that the various steps of the operation could now be successfully carried out. The speculum was applied, the eyeball seized, and the cataract-knife had transfixed the cornea, when respiration and cardiac action again stopped. The patient now seemed quite dead. The eye instruments were quickly removed, and the patient in an instant was hung up by the feet, with head down. No attempts were made at artificial respiration, nor were any other means used for resuscitation, but the inversion, not even throwing open the windows for fresh air. As still as death, we watched the suspended body. After a few minutes, which seemed a very long time to us, a feeble respiratory movement was detected. This slowly developed into full breathing, and brought back the pulse, and with it life to our patient.

She was again laid on the table, utterly limp, but breathing freely. When the eye was touched the head made again a sudden movement, showing a degree of conjunctival irritability which rendered the completion of the eye operation impossible. The question now before me was whether I should leave the eye with an operation half performed, or protect the patient from future suffering by completing what I had started out to do. After consultation, I concluded to perfect the operation, and, with an abiding faith in the efficacy of suspension, I ordered chloroform again to be administered. For the third time quiet sleep was quickly induced, and, fortunately, with no



further complications or trouble, the operation was successfully and safely completed.

Twelve years ago, a fourth case occurred under my treatment. A gentleman brought to me his two boys, one eight, the other six years of age, both subjects for squint-operation. Such operations I frequently perform in my office, with the aid of one professional assistant. The elder boy was put to sleep under chloroform, the tenotomy of the fectus completed without trouble, and he was laid upon a lounge, vacating my reclining operating chair for the younger boy. He also bore chloroform apparently as well as his elder brother, and under its narcotic influence the squint-operation was speedily completed. After I had removed the eye-speculum, and cleansed the conjunctival sac of blood, respiration suddenly stopped, the pulse disappearing from the wrist, and accompanied by the death-like appearances which belong to this startling condition. Fortunately, I was sitting at the head of the patient, and I immediately tilted down my end of the operating chair, getting my assistant to elevate the foot-end, so as to secure an elevation of forty-five degrees, with the head of the patient downward. After a few minutes, blood gravitated into the head. By stimulating the nerve-centres, it started into action those organs so essential to life. Breathing was finally re-established, and with it the circulation.

These four cases of sudden arrest of the respiratory functions, with failure of the heart's action during chloroform-narcosis, occurring in my own individual practice, I feel assured that most of these patients would have died had they been left in the recumbent posture, regardless of what may have been done otherwise for their restoration. Fanning, fresh air, water-splashing, spanking, whiskey or ether injections, electricity, artificial respiration—all of them the remedies which physicians rely upon—go for very little provided the patient be left supine. General experience, unfortunately, has too often shown this. In my experience in chloroform, in cases of suspended animation, all of

these means for resuscitation are useless, provided the patient be hung up by the feet without any loss of time, so that blood may flow to the anæmic head and heart and stimulate the nerve-centres before the vital spark goes altogether out. A fire cannot be rekindled by adding fuel if there be no live coals in the grate. Fortunately, suspension of the body needs no preparation nor apparatus for its immediate application. It only needs vigilance on the part of the operator. Should fright make him forget his duty, then precious minutes are lost in trying useless remedies, and these precious minutes can never be recalled.

That all of my cases of apparent death from chloroform should have recovered, is not merely good luck, nor is it accidental. I know that chloroform, ether and ethyl are powerful agents for good, and also for evil. I am sure that I can kill any patient by the abusive or careless administration of either of these remedial agents, just as I am sure that I can be burned by any kind of heating apparatus which I am so dependent upon for genial warmth in winter.

The successful administration of an anæsthetic does not consist merely in holding before the nose of the patient a cloth with the narcotizing agent poured upon it. Skill, care, prudence, judgment and courage in time of need, are all necessary to guard the narcotized patient from danger. Too little of the anæsthetic—not enough to protect the important vital centres from the influence of painful reflex actions—is as dangerous as an overdose of the narcotic inhalant. Many of the fatal accidents occur in the hands of timid physicians or dentists who are afraid to administer enough of the anæsthetic to secure the stage of safety, the immunity from reflex disturbances, and who lose their heads in fright when the danger which their want of confidence has induced presents itself.

The lesson which I would impress upon every one who uses chloroform, sulphuric ether, or the bromide of ethyl for general anæsthetic purposes is, that prompt suspension,

with head down, is the remedy for suspended animation suddenly coming on during acquired narcosis.

No surgeon recognizing the responsibility of his work should ever give an anæsthetic without having some one present. Should there be any sudden and alarming weakening of the heart's action and of respiration—for they always go together—without a minute's delay hang up the patient. Should the patient be bulky, and should there not be force enough present to elevate the foot of the table or bed, be the patient man or woman—while you stoop, throw their legs over your shoulders, hang on to their feet in front of you, and then lift yourself. The patient's body, as you get on your own feet, will hang from your back, with the head down. Now you have time to call for more help, if you need it. Never wait for the help to come before you practice suspension, because with the moment's delay your patient may have passed from dying into death, from which there will be no more earthly awakening. When too long delayed—and one minute is a fatal loss of time—suspension is as useless as the other recommended remedies, and can then do no good.

Should the case have been one of needless fright, with only weakening, and not suspension, of the vital functions, no harm has been done. The feeble pulse will always respond promptly to the suspension. It is my constant practice to use suspension for restoring strength to the heart's action after the administration of chloroform, where there is cardiac depression and weak breathing. I use this means of restoring vigor where others use the more objectionable and less efficient hypodermics of whiskey or ether, or the inhalations of nitrate of amyl. It is very instructive to observe how promptly the pallor leaves the face, and how strong the pulse will become, as blood gravitates toward the head. Should vomiting occur when the head is hanging down, this suspended position is better for the patient than when lying upon the table, because there is no fear of food-particles getting into the larynx. Inversion of the body gives the contents of the stomach free vent.

Such confidence do I feel in the value of suspension with chloroformed subjects that I am sometimes disposed to believe that the vital centres cannot fail with the head hanging down.

Not long ago, in the presence of the medical class of the University of Maryland, I removed by ligature a very large staphyloma from a child one year old. It was the result of purulent ophthalmia of the newly born. The prominence of the opaque cornea was so great that the lids could hardly close over it. The summit of the tumor was being irritated by the constant friction of the lids in winking, and its removal became necessary for the comfort of the child. Under chloroform-anæsthesia I transfixed the eye-ball at the base of the tumor by two long, curved needles, placed at right angles to each other. Besides these, acting as a shoulder, I applied the ligature for the strangulation of the tumor. The medical class could not see from the benches the various steps of the operation upon so small a portion of the body and from the large number of students present only a few could have crowded around the operating table. After the ligature had been secured, and before the needles were withdrawn, I did not hesitate to hang up the infant by the heels, with head suspended vertically downward, and then walked with it in front of the benches, so that the students could inspect the eye. To the uninitiated this would appear a heartless and dangerous proceeding. My experience and consequent faith in suspension had taught me that this inversion was the safest position for the narcotized child during the tedious inspection.—*Medical Record*.

## ARTICLE III.

A MISPLACED RIGHT SUPERIOR CUSPID  
TOOTH, WITH RESULTING SEQUELÆ.

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REPORTED BY W. W. H. THACKSTON, M. D., D. D. S.

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About the first of September, 1885, Miss Ellen F., aged between thirty-five and forty years, applied for the removal of a few remaining stumps and roots, for the purpose of having inserted an upper set of artificial teeth.

Upon examination I found nothing unusual or abnormal. The lady had previously submitted to the extraction of her teeth as they broke down and became annoying, by her family physician, leaving in her upper jaw only some half dozen stumps and troublesome roots. The sockets and processes of the extracted teeth were well absorbed, the gums shrunken, clean and well rounded, the roof of the mouth, the palate processes of the superior maxillary bones, and the palate bone itself, were all covered with the usual and normal cushion of soft tissue, with no observable ridge, prominence or projection, showing but the normal rugae, and they not noticeably prominent. Neither to the eye nor to the touch was there the slightest indication of the presence of a concealed tooth or the fragment of a root.

In a few months an artificial set was made and inserted. The adaptation, antagonism and arrangement of the teeth was satisfactory in every respect, and for two years the teeth were worn and used with the greatest comfort and enjoyment. I regarded the operation as a "success," for I had several times met my patient and always found her grateful, charmed and enthused with her "new teeth," which she declared were more comfortable, useful and ornamental than her natural ones had ever been.

My surprise and disappointment may be imagined

when, a few weeks since, my patient was brought to my office in a state of excitement and nervous prostration that induced a fainting fit soon after taking her seat in my chair, and before I could even make an examination of her trouble. The account given of her case was that a few weeks previously, while visiting friends in the city of Lynchburg, Virginia, she found the roof of her mouth getting tender and painful; the attachment of the plate became insecure; the teeth appeared too long, and did not antagonize the lower ones properly; the pain and swelling in the roof of the mouth increased, until the teeth could not be worn. A dentist was consulted, who said he thought the plate pressed too much upon the "roof," and proceeded to scrape and cut away as much as the thickness of the plate would allow. This afforded no relief; the swelling of tissue progressed, pain and systemic disturbance increased, and, finally, abscess formed, pointed, and discharged freely. The discharge continued; the swelling and enlargement did not subside; the pain was not relieved; the lump, or tumor, became hard and unyielding to pressure. The dentist was again consulted, and he informed the lady that he did not understand her case; feared it was serious; that she had better see a physician, or go to the dentist who had made her plate. A city physician was at once called in, who pronounced the case a grave one; said a bony tumor had developed which might be malignant; that she had better see a surgeon, etc. Miss F. returned in haste to her home and at once called in her family physician, whose examination and diagnoses, unfortunately, confirmed the views of the Lynchburg dentist and physician, and greatly increased her anxiety and apprehensions. The doctor declined to treat the case, and advised the lady to see me without delay.

In a day or two Miss F. was sufficiently recovered from her fainting paroxysm (which, by the way, was one of the most protracted and difficult of management that I ever encountered,) to submit to an examination and any operation determined upon. I had invited and had present my

friend, Dr. Vaughan; of Farmville, a skillful and accomplished general surgeon, to assist me in the examination and in whatever operation we might find advisable. I commenced the examination by passing an exploring probe through the sinus which had been formed by the discharge of pus and ichor, which sinus opened a little below and just back of the foramen incisivum, leading back along the median line in the direction of the palate bone. I was at once rewarded by a sharp, ringing sound, and that impression of touch with which dentists are so familiar. I found the point of resistance to be a little roughened at its anterior extremity. Continuing the exploration, I found the shape of the hard body to be oval and oblong. Without remark I handed the probe to Dr. Vaughan, who repeated the examination, and, in doing so, he struck the roughened surface to which I have alluded. The doctor, being a physician and general surgeon, and of course not familiar with what we designate "the enamel touch" when we came to consult and compare notes, was inclined to question my diagnosis, that it was simply a misplaced and imbedded tooth, with an enameled crown and fully developed root. We, however, agreed that whether a tooth or a bony growth, its prompt removal was indicated. Our patient being now reassured and in good spirits, readily consented that the operation might at once be proceeded with, and bravely declined the use of any anæsthetic.

Feeling very confident that my diagnosis of the case would be verified, I determined to first look and feel for a tooth, and, if successful, at once remove it. With a simple curved gum-lancet I made an incision down to the enlargement, a little more than half an inch, in length, and at the most dependent and prominent point, a transverse incision. I then dissented around the hard substance as far as practicable and introduced a very narrow, thin-bladed root-forceps, with which, after some difficulty, I succeeded in getting a firm hold; gently feeling my way, and cautiously applying force, I recognized some motion and yielding in

the object embraced by the forceps, satisfying me that there was slight, if any, bony adhesion. I at once applied about the force usually employed in extracting a bicuspid tooth, disengaged and took away a fully developed cuspid an inch in length, crown and root, with none of the characteristics of a supernumerary, but just such a tooth in size and development as should have been found in its natural position in the dental arch. The tooth lay alongside and parallel with the palatine suture, a little to the right of the median line, and was attached to the palate process by its inner or lingual surface, the crown and cusp pointing forward and the root running back nearly or quite to the palate bone. There was no root socket or alveolar matrix. The attachment, though firm and strong, was simply fibrous and periosteal. The enamel had been eroded and roughened, I think, by the acrid secretion of the abscess, and the point of the cusp had either been chemically dissolved or, possibly, nibbled away by the bugs—the “microbes.” It was that roughness which mystified us in the examination, as we had to rely solely upon the “touch.”

The recovery was rapid and complete. A little uneasiness was felt for a day or two in the right maxillary sinus and nostril, but in three days the teeth were again in the mouth, the plate fitting as perfectly as when first inserted, and the denture rendering comfortable and satisfactory service. A month had elapsed, and no trace or symptom of the trouble remains.

We can readily understand how an unerupted tooth could occasion all the disturbance, suffering, doubt and uncertainty as to the cause and true character of the manifestations and expressions in this case. We can understand very readily how dentists, physicians and surgeons could be mystified and misled in making a diagnosis, but the perplexing and embarrassing question is, where did that tooth come from? Where was it when I made a careful examination and first took the impression for the artificial denture?



It was certainly not at that time in the roof of the mouth, and there was no appearance or indication of the presence of a tooth or root, or fragment of a stump or root, in or about the upper jaw. I do not think it reasonable or probable that a straggling or wandering follicle or tooth germ should have fixed itself upon the palate process, and in two years have developed such a tooth; and even if so, I should have expected the trouble to have been gradually manifested, a slow but progressive growth, and increasing uneasiness; but in this case the manifestations were sudden—a period of a few weeks comprised the origin, progress and treatment of the case.

There was no opening (that could be discovered) into the maxillary sinus, but I think the tooth grew and developed, in some niche or recess in the irregular walls of the antrum, and from some cause, possibly the application of a plate holding a set of teeth, there was excited and stimulated a change of position, and the tooth found its way to the point from which it was taken. This, however, is mere hypothesis and conjecture. Of what I am assured and certain in the case may be briefly summed up. There was no tooth in the roof of the mouth when I inserted the artificial teeth; for nearly or quite two years the plate was worn with comfort, suddenly, and without premonition, the trouble came on, with the symptoms and conditions described, and perfect relief and cure was accomplished by finding and removing the hidden tooth, the source and cause of great suffering and mental distress to the patient and great perplexity to the professional gentlemen who were consulted in the case.

I trust the readers of the *Journal* will excuse this lengthy and circumstantial report, when I assure them it has been written solely for the benefit of the profession, especially the younger members. It may be their fortune to encounter such a case, and they need not always anticipate, or diagnose *exostosis*, *bony nodules* or *osteosarcomas*.

[The tooth, Dr. Thackston sent us for examination. It would not be taken for a supernumerary tooth, as it is of good shape and length.—ED.]—*Southern Dental Journal*.

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## ARTICLE IV.

## AMMONIA VS. ZINC FILLINGS.

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BY LEVITT E. CUSTER, B. S., D. D. S., SPRINGFIELD.

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[Read before the Ohio State Dental Society, Springfield, Ohio,  
Oct. 1887.]

The destruction of zinc fillings has usually been attributed to attrition and the "oral fluids." This *modus operandi* of the former is easily understood, while that of the latter is more vague of comprehension. It is easy to understand why a phosphate cusp should gradually disappear; but why, in some cases, disintegration of the same filling takes place at and under the gum we cannot so easily answer. Often there are cases where the subgingival destruction exceeds that at the more prominent points. The surface produced by wear is hard and more or less smooth, while that produced by the oral fluids seems to be porous and under process of disintegration.

The oral fluid is often blamed and made to cover a vast amount of ignorance because of its complex nature; but I shall try to prove that it is not an oral fluid, as such at all which produces this disintegrating effect so often found at the necks of the teeth. In one instance the presence of some one distinct agent is acknowledged, for it has been recommended to fill the cervical border of the cavity with gutta-percha and complete with phosphate, thus avoiding the force of this agent. If the teeth are bathed in the oral fluids entirely, why this peculiar disintegration at just one point? The observing dentist, upon reflection

'will acknowledge the value of these facts and admit the possibility of a destructive agent other than the oral fluids as a whole. Whatever be this special agent, it is evident that it is formed at the point of attack.

The formation of ammonia in the mouth has already been explained by Dr. Watt in his essays. The initial step in the formation of nitric acid is accepted by all who accept this theory of the cause of dental caries. Those who do not accept this theory must admit the possibility of ammonia being formed in the process of putrefaction, whether or not it aids in the formation of nitric acid. Putrefaction is denominated such in distinction from fermentation by the presence of nitrogen. The odor of putrefaction is due to this element. The presence of hydrogen uniting with nitrogen in the proportion of  $H_3N$  forms ammonia. Again it is claimed that some bodies are often supercharged with ammonia, which may be termed ammonical diathesis, accounting by another means for the presence of ammonia. In this way it is eliminated by the oral mucous membrane and by the gingivæ directly upon the phosphate filling.

The reaction of ammonia upon zinc fillings I believe to be neutralization of the acidity of the fluid portion. The hardening, or let it be crystalization of the zinc mixture, is due to the acidity of the fluid portion; any acid menstrum has this effect upon calcined oxide of zinc. Dilute sulphuric acid produces an uneven, quick-setting cement, whereas acetic produces just the opposite results. But for dental purposes phosphoric acid, for its intense hardness, and chloride of zinc for its therapeutic effect, give the best results; yet these acids, when neutralized by ammonia, have no hardening effect whatever.

When the cement has once hardened, the neutralizing effect of ammonia may be objected to. Now I believe the setting of plaster-of-Paris represents what takes place upon mixing calcined oxide of zinc with a dilute acid. In the former the water enters as water of crystalization, in the

latter what may be termed an *acid of crystalization*. Now as heat drives off the water of crystalization, so does ammonia neutralize the acid of crystalization, and the oxide of zinc falls down as a white powder. These are facts, as experiments have shown. Furthermore, this oxide of zinc thus produced is again capable of becoming a hard mass upon union with phosphoric acid, and the process may be again repeated. Upon this principle cement instruments may be cleaned by letting them stand a few minutes in ammonia water.

Having accepted that ammonia is formed in the mouth from whatever source, and the above being the reaction of this gas upon the crystalized zinc filling material out of the mouth, it is right that we should conclude that the same reaction takes place in the mouth. Litmus tests have shown an alkaline reaction where zinc fillings are destroyed by the oral fluids so-called. Ammonia, the product of putrefaction or ammonia eliminated by the gingivæ, are alike in their effect upon phosphate or oxychloride fillings either as a gas or seven hundred volumes dissolved in one of water; this I believe to be the destructive agent found in the oral fluid.—*Dental Register*.

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#### ARTICLE V.

### ON THE CAUSES OF ACUTE SUPPURATIONS IN THE LIGHT OF PRESENT SCIENTIFIC VIEWS.

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(From a dissertation of A. Luckerman, of the Laboratory of Surgical Pathology of Kasan.)

After stating the literature of the subject, the author details a great number of his own experiments, by which he reaches the following conclusions:

1. Neither chronic, nor mechanical, nor thermic agents

of irritation have the power of producing suppuration in the absence of microbes.

2. If suppuration is produced under the influence of the above named irritants, pyogenous fungi were, of necessity, in simultaneous co-operation.

3. Even substances *chemically pure* may be *impure* mycologically, as disinfectants like turpentine, tar, etc.

4. At present, the following fungi are to be considered *causes of suppuration*: *staphylococcus pyogenes aureus*, *albus et citreus*, *streptococcus pyogenes*, and possibly, in fetid abscesses, *bacillus pyogenes fetidus*.

5. Inoculations with staphylococcus and streptococcus when in very large quantities, will usually cause death, and in all cases will produce suppuration.

6. It is to be supposed that said microbes are *present* in nature very extensively, on account of the frequency of suppurations.

7. They do not seem to be present in air very *numerously*, nestling so much the more in most of our domestic objects.

8. These microbes may penetrate into the body *either* by respiration, or by the channels of digestion, or *by* the skin. The latter channel seems to be the more frequent one. Besides, they may make their invasions by *various* cutaneous channels, and even, the cutis being intact, *through* the glandular orifices, as has been demonstrated by Garre's, as well as the author's experiments.

9. As far as the clinical material, accumulated *until* now, vouchsafes a conclusion, staphylococcus *pyogenes* shows the more frequent occurrence, and then streptococcus *pyogenes*.

10. *Rosenbach's* opinion that streptococcus *pyogenes* was the cause of diffuse phlegmons, and staphylococcus *pyogenes* the cause of circumscribed suppuration, has *not* been confirmed by other authors.—*Chirurg. Westnik, 1887, Russian.*

# Monthly Summary.

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THE APPLICATION OF HERBST'S METHOD TO TIN GOLD FILLINGS.—*By Wm. M. Gabriel, M. R. C. S., L. D. S. Eng.*

—When experimenting with tin in conjunction with gold, I filled one or two compound mesial cavities in bicuspid and molar teeth out of the mouth. These cavities I partially plugged with the combination metal and contoured the crowns with gold. During my work I was struck with the much longer time needed for the insertion of the combined foils when filling with a matrix, some form of which is often indispensable when dealing with distal cavities in bicuspids and molars. The much greater care necessary to secure good edges I could not help also noticing.

The fact that it was possible by Herbst's method to weld and make tin quite solid, suggested to me that one might be able to work the combined foils in this way, and that the gold might be burnished so as to adhere to the combination metal.

I find the combined metals quite as easy to work by Herbst's method as tin or gold separately, and no more difficulty in making an *un-annealed* gold cylinder adhere to a foundation of tin-gold, by means of a burnisher rotated in the engine, than to a mass of gold. I think, however, that no more reliance should be placed upon this union than upon so-called retaining points; but that the coronal half of the cavity should be shaped so as to make the gold self-retaining.

Personally, I prefer to burnish gold over all the tin-gold exposed, and then complete the operation with the mallet; but this, of course, is quite a matter of taste.

The matrices I use are a modification of Dr. Guilford's bands, retained in position by his clamps A, B, C and sometimes D. These bands I hope to further improve and speak of at some future time.

It is difficult to keep the ends of the bands now sold from getting disengaged from the little points on the clamps. The fact that they rarely fit the tooth to be filled is another disadvantage. This can often be overcome, if the band be too large, by a wooden wedge driven between the band and the side of the crown of the tooth. I prefer, however, whenever possible, to cut out the cavity, take an impression, and wedge at the first visit, fit a band to the model and by means of this fill at the next.

I use a sheet of tin foil (S. S. W. No. 6), laid between two sheets of *cohesive* gold foil (Keasing No. 4). This is cut into two or three strips; made into ropes and cut into pellets. The gold cylinders used are S. S. W. Velvet (small sizes).—*Dental Record*.

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**DARK JOINTS.**—One other pest of the laboratory is dark joints, and there are various causes that creep in to render the cases we often wish to be our best anything but what we could desire. First of all, the great cause is not rubber, but *wax*. You may grind your joints ever so carefully, and boil them or rinse them out with hot water ever so thoroughly, but if there is a particle of wax in them, or if a particle has been in, you may look for discoloration. Take a piece of glass or porcelain, and melt some wax on its polished surface, and boil it in water ever so long, and as long as it is not rubbed it will remain greasy, and the heat of vulcanizing is sufficient to discolor it. Now a ground surface, like that of a fitted section, is far more difficult to clean than a polished surface; then too, hot wax is a solvent of rubber, and will lead the vulcanite into the joint. How can this be avoided? By simply keeping the wax out by keeping the ends of the sections wet. If wax gets on them, grind it off, for you cannot clean it.

One other cause. I noticed a brother in the profession, the other day, grinding up a case, and in order to see what kind of a joint he was making he touched the sections with the tip of his tongue, thus wetting the joints. If any saliva gets into a joint before vulcanizing, there will be discoloration, as the organic matter contained in it will char and blacken under heat.—*Dr. J. H. Beebe, in Odontographic Journal*.

**PERSEVERANCE AN IMPORTANT FACTOR.**—In any line of business, the man who uses reasonable economy, and has the ability to give fair management and the perseverance to hold on, will, in a great majority of cases, make a success; while, on the other hand, the one who rushes into whatever he has undertaken with a spasmodic endeavor to win all at once, as a general rule wastes his energies, and often fails for sheer want of perseverance. The editor of the *Industrial Gazette* has observed that the man who starts in to do a day's work, and attempts to do as much in one hour as ought to be done in two, will usually find it necessary in a short time to take a rest, and while he is resting will lose valuable time, which he evidently feels he ought to make up, judging from the spasmodic efforts he will make when he starts into work again. But at night the man who works steady, but perseveringly, will be found to have accomplished the most, while usually he will also be found in a much better condition to commence again the next day.

So it is in business. One will seem to hustle around and make a considerable do over what he is doing, and after wasting his energies in accomplishing what, by taking a little more time, could be done with very little effort, and then, because, as he thinks, he fails to meet the success he imagines he should, becomes discouraged, and is ready to make a change to something else. This, in a majority of cases, proves a loss, and, in consequence, he does not succeed as the energy he displays would seem to warrant. Another man, while he may not make a great display of his energies at the start, will go to work more systematically, and will have better opportunities to economize, and in many cases to manage better than when he attempts to rush things. If he will but observe, he will be ready to take advantage of any favorable circumstances that may arise. The man who is constantly shifting about is always making a change at the wrong time, when a little perseverance would have brought him through all right. In all lines of business there are fluctuations, ups and downs, and to succeed we must persevere. It is when the odds seem against us that it seems the most important to persevere.—*Scientific American*.



**THOROUGH EXAMINATION.**—*By Dr. Elbridge C. Leach, Boston, Mass.*—Can anything too forcible be said on this point? Can there be anything more humiliating to the dentist than to look the patient's mouth over and then have the patient point out the one trouble for which he visited you? Can the dentist do better than to spend ample time on his examinations; pointing out the work which should be done at present and take good care to call the patient's attention to whatever work the dentist may discover which does not require immediate care? For instance, how often do we discover imperfections which do not require attention at once, like superficial decay on the neck of a tooth which it would be unwise to fill at the time of discovery, making a strong point of calling your patient's attention to it and to the fact that it does not require attention at once in the way of filling? How often do patients return after the completion of a course of operations and point out an apparent oversight of yours and thus imply your inefficiency in examination?—*The Archives of Dentistry.*

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**A VOICE RAISED AGAINST CARPETS.**—A leading New York City physician distinguishes himself from his fellow-mortals by inveighing against carpets. He denounces them as ugly in appearance, and worst of all, as unclean and unhealthful. He says: "The carpet holds the poisons of all diseases, such as scarlet fever, diphtheria, and the like, long after the rest of the room is disinfected. I always remove the rug, even from a sick room, where I can find a rug to remove. The carpet retains dust and dirt, and the most careful housewife cannot keep it clean. It is impossible. Now, the rug may be taken up and thoroughly swept on both sides whenever the housekeeper wants to do so. Then there is nothing in the way of house furnishing so handsome as a painted and highly polished floor, decorated with Persian or Turkish rugs. No carpet ever made is so pleasing to the eye. Yes, the carpet must go, and I only wonder that the crusade against it has been delayed as long as it has."—*Pacific Record of Medicine and Pharmacy.*

EXPERIMENTS.—As experiments I have inhaled chloroform, ether, bichloride of methylene, also nitrous oxide gas, always without ill effects and receiving at times useful practical lessons.

My last test upon myself was with cocaine, when, about four months since, in the presence of my wife and some friends, I injected, slowly; twenty minims of the solution of cocaine, in close proximity to the thumb nail of my left hand, the result being utter insensibility of the part extending to the first joint. The non-sensitiveness continued for about an hour or more, during which period I subjected my thumb to most severe treatment, but without experiencing the slightest pain or even feeling; partial numbness existed for nearly two days, but unattended with any constitutional disturbance.

I am gradually losing my thumb-nail through the mechanical injury I perhaps stupidly inflicted.

My experience thus far is sufficiently inspiring to make me believe that cocaine is a most valuable drug, and could, I feel convinced, be used with advantage in minor and even major surgical operations, often preventing the infliction of unnecessary pain.—*A. W. Furber, L. D. S., in British Journal of Dental Science.*

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WHAT IS PAIN?—It is one thing to know a thing, it is quite another thing to tell it. A definition for pain seems to have been more than lexicographers could "masticate." The *Popular Science News* says:

"An eminent physiologist calls it 'an excess of the sense of touch,' and another 'hyperæsthesia of the sensory fibres.' Dunglison, in his Medical Dictionary, says 'it is a disagreeable sensation, which scarcely admits of definition;' and Gardner, in his work of the same title, under 'pain,' says 'see Dolor,' and turning to 'Dolor,' we find it concisely explained as 'pain.' The great French Dictionnaire des Science Medicales coolly and conveniently tells us that to define it is superfluous. Professor Erb, in Ziemssen's Cyclopædia, after some discussion, comes to the conclusion 'that pain is a new sensation, experienced when excitation of the nerves reaches a certain intensity.'

Perhaps the Imperial Dictionary covers the ground in describing it as 'an uneasy sensation in animal bodies, of any degree from slight uneasiness to extreme distress or torture, proceeding from pressure, tension or spasm, separation of parts by violence, or any derangement of functions.' This is also Webster's definition, and is really not more exact than some of the others, although longer."—*Chicago Medical Times*.

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GOLD IS AND WILL REMAIN THE KING OF FILLING-MATERIALS, and the practitioner of the most mediocre ability is using it more and more. As he learns to preserve more of the teeth with the plastics which he formerly extracted, so now he is also ambitious to extend his knowledge of gold filling and increase his practice of it. When the most ordinary dentist is ambitious to do fine work, and that ambition is fix habit, he is a saved man. By persistent study and the practice of better methods, he will soon be lifted above mediocrity, and his further progress is then assured. Just as sure as he is desirous of progressing, will he develop and improve. No man is so poor a workman, or so unpracticed a student, or so illiterate, but that, with a sincere desire to improve, he may attain a degree of ability that will be a pride to himself and friends, and in the use of gold for filling, no man is so unfortunate in early training but that, by proper study and application, he may attain a respectable ability.—*A. H. Thompson, Topeka*.

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FLIES IN THE OPERATING ROOM.—Every one must have experienced the intolerable nuisance flies are during the summer in the waiting and operating rooms. In Switzerland oil of bays (huile de laurier) is used to prevent the visits of these "household friends." A coat of this oil is applied to the walls, which effectually excludes flies of all kinds. This remedy has also been tried and found effectually in the south of France in preserving gilt frames, chandeliers, etc., from becoming soiled. It is even remarked that the flies soon avoid the rooms where the application is employed.—*British Journal of Dental Science*.

**ANCHOR PINS.**—For some time I have been using the double headed pins used by the manufacturers of artificial teeth, as anchor pins in filling badly decayed and broken down teeth, and have come to regard them as valuable in saving such teeth.

If exposed, destroy the pulp and fill the root canal with a guttapercha cone. I follow this with filling the pulp cavity with oxyphosphate, and before it hardens I put in one or more of the pins so that their round heads will project into the cavity far enough above the surface of the cement to act as anchors for either a gold or amalgam facing, and pack the cement closely around the pins. I wait awhile and then remove the excess and clear the margin of the cavity before it gets hard.

When it has hardened sufficiently I made a shallow cavity with the heads of the pins projecting into it. Around them I anchor the gold or amalgam.

For incisors I use one large pin, and for bicuspid and molars, two or more pins slanting them so as to give them greater strength.

I have built up incisors, cuspids, bicuspid, and molars in this way where it seemed impossible to get retaining points sufficient to hold a filling, and had made good useful teeth of them.—*Dr. L. West, Marionville, Mo.*

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**THE CULTIVATION OF THE FACULTY OF KNOWING** is of incomparably greater moment than the mere acquisition of knowledge. He is not the best of explorers or campaigners who is the most burdened with baggage, but he who knows how to forage well, and how to make the best possible use of what he has or can obtain. So it is with the student; to know how to learn, so that when need arises knowledge may be quickly obtained, is a better provision for the business of life than is afforded by the largest or richest store of information packed away in the memory—perhaps so packed as to be inaccessible when wanted. If students for themselves, and teachers for their pupils, would insist on the importance of "learning how to learn," instead of cramming, there would be fewer disappointments in life, and greater and more enduring successes. The vanity of carrying a huge quantity of information for the

sake of display is contemptible. The folly of attaching any real value to vast stores of knowledge is pitiful. The only brain properly worth carrying about is the power of finding at pleasure and learning at will precisely what is wanted; and this power cannot be acquired without considerable practice in the art of learning—an art which the student should make it a first object of his best endeavor to master.—*Lancet*.

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COCAINE AND CARBOLIC ACID ANÆSTHESIA.—M. Vian (*London Medical Record*) found that Witzel's method of injecting  $1\frac{1}{2}$  grains of cocaine in dental operations gave very good results, but two out of eight patients experienced constitutional disturbances of an alarming character, and several others were markedly inconvenienced. He therefore dissolved three-fourths of a grain of cocaine in eight minims of a two per cent. solution of carbolic acid, which he used as follows: Eight minims of the above mixture are slowly injected, half on the labial and half on the lingual or palatal aspect of the gum at a spot situated half-way between the neck of the tooth and the presumed end of the root. A finger should be kept over the site of the puncture to prevent the escape of the fluid, and the surrounding parts should be protected by pledgets of cotton-wool. The patient rinses out his mouth with water, and five minutes are allowed to elapse before beginning the operation. M. Vian has operated on eighty-six patients, with a very successful result in all; no disturbance, except of an emotional kind, ever following. Very good results were obtained by the use of the carbolized solution alone, and he is disposed to consider carbolic acid as efficient a local anæsthetic as cocaine for dental purposes.—*The Odontographic Journal*.

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TALENT VS. GENIUS.—Talent is full of thoughts; genius is full of thought. Talent has definite plans and activities; genius has power that is an unknown quantity, and aims quite as indefinite. Talent has many ends in view, and prides itself on the extent of its vision; the aim of genius is concentrated,

and its vision is narrow. Talent is cool, logical, convincing; genius is hot-headed, jumps at conclusions, and is often the laughing-stock of observers. Talent gains its ends by degrees, occupies its vantage ground with dignity, and is the commander of its situation; genius worms itself to its positions stealthily, knows no dignity and cares for no praise. Talent is the plodding investigator, the exhaustive student and the orator of the rostrum; genius is the alchemist, the close observer and the secret, cunning worker. Talent investigates the reason of things, prides itself on the logic of its conclusions, and avers a thing cannot be that does not accord with the rules of science; genius looks for the results, not the reasons for it; knows no logic but facts, and doubts nothing. The world would go awry if it was not for talent; but its progress is largely due to genius; its results are sometimes wonderful, quite surprising the credulity of talent, but accepted by the common people with gratitude.

But talent may be sleeping, and genius may spend its strength on nonsense. To be of use both must have a worthy purpose, and each must be guided and inspired by a motive that shall raise it above the miasma of lust and selfishness, or either will become poisoned and diseased, a curse to the world.

We all have some talent and some genius; so little of either, perhaps, that great exertion must be made if we would rise into any respectability and success. But we can use what we have, and use it to the utmost; then we shall not be pigmies, though we may not be giants; there will be many of shorter stature, though there will be some taller, and we shall have the consciousness of seizing every opportunity for self-development, though many may run past us.—*Items of Interest.*

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POISONING WITH IODOL.—Pallin (*Hygiea; Ctrbl. f. Chir.*) gives an account of a case of necrosis of the clavicle in which an operation was performed for the removal of a sequestrum and 75 grains of iodol were applied to the wound. During the evening of the same day the patient became delirious, and on the following day his temperature was 102.2° F., his pulse was 136, small and irregular, and he vomited and was

apathetic. The urine showed traces of albumen and a weak iodine reaction. Although the dressing was changed at once, all the iodol being washed out of the wound and bismuth applied in its place, the symptoms of poisoning lasted four days longer, and for a fortnight iodine was to be recognized in the urine.—*Ibid.*

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IN REGARD TO OBTUNDENTS, a good deal depends upon the operator and his ability to influence the patient. In so many cases of sensitiveness as we have to deal with, we must have some obtundent. Absolute alcohol is good in some places. When the rubber has been adjusted and the cavity dry, pain is more pronounced upon application of any medicine, and especially if it be a cold liquid. It is better to apply the obtundent warm, as there is less pain, and it also increases the local anæsthetic property. Alcohol, or anything that evaporates the water in the tooth, causes pain for a moment, but this soon passes off and we get the desired effect.—*Dr. A. W. Harlan, in Ohio Journal.*

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A RECENT writer inveighs against indiscriminate use of tea and coffee, especially in the young. He is of the opinion that against the practice of giving them to children we can not speak too strongly. Childhood is the period when the nervous activity is at its greatest. The brain is very busy in receiving new impressions. Reflex action, co-ordination of muscles, and the special senses are all under a constant course of training. The nervous system is pushed to its utmost capacity, and long is the list of victims that follow this overstimulation. In these little people, nothing but harm can come from the use of such cerebral stimulants as tea and coffee.—*Power and Transmission.*

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In using steel jack screws the corrosive effect of the oral secretions may be prevented, and the screws nicely lubricated, by immersing them in hot paraffine. This should be done every three or four days.

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ARTICLE I.

## ODONTO-CHIRURGICAL SOCIETY.

SOME REMARKS WITH REGARD TO ARTIFICIAL CROWNS.

BY DR. WILLIAMSON.

### METHODS OF ATTACHMENT.

This part of the subject might easily be developed into tremendous proportions, as dental ingenuity would seem to have been exercised to its utmost in the endeavour to devise an ideal method by which a crown may be attached to a root.

There are probably some seventy or eighty methods, or variations of methods, and in each one of these there is some objectionable feature or features; the reason being, as in many other things, the difficulty of combining all the desirable qualities, which may be classified as follows:—

1. Natural appearance of crown.
2. Perfect fixity and strength of attachment of crown to root.
3. Preservation of root from decay.



To accomplish these principal ends, varieties of two methods have been employed, (1) attachment by means of a pin in the root; (2) attachment by means of a collar or band encircling and fitting the end of the root, generally combined with the use of a pin.

I will not enter into the various details, but merely make a few remarks in regard to those methods that I have had some experience of, and, to do this, the best way will be to make a division of the teeth into two classes—(1) Incisors and Canines; (2) Bicuspids and Molars.

1. *Incisors and Canines*.—This is the class that we are most frequently called on to treat in the way of artificial crowns, and where there is most reason for the operation, because towards the front of the mouth the alternatives of a suction or grasp plate are both objectionable, the former from its bulk, and the latter from the probable injury to the teeth in the case of a careless person, and from the difficulty of concealment of the fastenings in some cases. The loss of a front tooth is a very potent way of bringing the patient to the dentist, especially with ladies, because of course the vacancy is so unsightly, and for this reason some little trouble should be exercised in order to obtain a substitute of natural shade and colour. In many cases this is a most difficult matter, and to me sometimes a worrying one. Even with a large stock to select from, there are various causes which increase the difficulty, as, for example, in the case of a lateral, where there is the different shade of the adjoining teeth, the light shade of the central and the darker one of the canine, the lateral being selected approximately more to the central. Again, where teeth are discoloured by approximal filling, it is difficult to make an artificial tooth appear natural beside it, except by colouring it on the same side to match the stained one. This is one of the most useful ways in which the method of tinting teeth, lately introduced, can be employed, affording a means of gradation from the natural to the artificial, not obtainable otherwise, and I have employed it in several cases with

advantage. An extra deep shade of grey or blue on one side of the tooth, and shaded off towards the centre, is a very effective means of concealing the transition. I had a case lately where a central incisor had to be replaced, the other one being stained a peculiar shade of yellow, as the result of an old injury. There was one tooth among those I had which was a fair match, but, being too short, I sent to a London house for a selection to match this colour. A score was sent, but none that could be called very near it, so the only resort was the painting method, which, after a number of trials, yielded a very fair approximation to the colour desired. There is one caution in regard to those painted teeth, and that is, they should be protected from the action of acid when the metal portion is boiled in it. Some of the colours seem to be affected by acid more than others. As to wear in the mouth, as far as I have seen, they stand very well. The fact of the not infrequent difficulty of selection of colour and size together is often so great, even with the assistance of the painting process, as to be, in my opinion, a fatal objection to the use in the front of the mouth of special crowns, such as the Bonwill, Howe, Weston, Logan, and others. Without sufficient compensating advantages, it is not worth while for any ordinary practitioner to keep a large number of any of these forms in order that he may find a suitable one for any particular case, for even then he may be at a loss for one; for instance, I noticed in the report of a New York clinic, held the other day in a dental depot, that the operator who was to set one of these special crowns could not proceed because he could not obtain one adapted for the case in hand. A plain tooth, then, is, generally speaking, the best form to employ, as it gives the greatest opportunity of fulfilling the primary object of a natural appearance, and if broken, can be readily replaced. As to the methods of attachment, I used at first the old method of a gold pin, with silk covered with varnish, and forced up into the canal. This method, although old-fashioned, is not to be despised in the case of a sound root,

and not a few in this country still think it one of the best—an opinion which would seem to be confirmed by the cases one meets with where such a tooth crown has lasted for many years. Still, in spite of some favorable cases, I do not continue its practice, as I always felt a degree of uncertainty as to whether, when the tooth was actually in position, it was tight enough, and if there was rather too much silk on the pin then it would not go far enough, a state of things not easy to remedy.

On the Bonwill crowns being brought out, I tried a few of them in cases of the first class, but did not find them very satisfactory, there being several causes of failure. The first one I used was in the case of a young clergyman who had a badly decayed canine root. The crown was set with amalgam, the pin used being the strongest form, of an elongated triangular shape, and the operation was in every way satisfactory; but three months afterwards he came with the tooth broken off, the pin having given way right through the angle which is the thickest part. Another one, a lateral, lasted three years, but, in this case, the lateral pin being very small, the strength lay in the amalgam. A central lasted about the same time, and finally the tooth substance broke at the back part of the ring, the weak part in all those of a similar pattern, because the crown is more or less weakened according to the amount of filling required, and also in the case of a close bite, where it requires grinding on the lingual side. In regard to the Bonwill pins, it is but fair to say that those I used were of the first pattern. Since then they have been made without serrations and of greater strength.

My next experience was with the system best known as Balkwill's from his having devised a set of instruments for the performance of the operation by means of a tooth soldered to a plate fitting the top of a root, and this again attached to a split platinum pin, which is forced up into a platinum tube screwed into the root canal. This is the method I have used most in cases of fresh sound roots, put-

ting on first some low grade gutta-percha on the root side of the plate, gently warming it over the spirit lamp, and then pressing it up into place, and of course trimming off the surface with warm instruments. It is one of the few methods that permit of the removal of the crown entire, but at the same time the pin must not fit the tube too easily, otherwise it would soon loosen. The quality of removability has led to its employment in removable bridge work. What I find most troublesome is the preparation of the root for the screw tube, the tapping being a slow process, and apt to give the patient the idea of the preliminary stages of root extraction by means of the screw, owing to the tap not cutting readily enough not to prevent a series of partial rotations of the root along with it. However, if the root is healthy, no trouble seems to be caused by the strain imposed in this way. People in my part of the country seem to have a general idea that pivoted teeth are screwed in, a peculiar accent being given to the word, which seems to imply some notion of great pain accompanying the operation, and so, partly for this reason, although it is not really more disagreeable, I would prefer to avoid the tapping process, and I do not know that it is really necessary, as what will do probably as well is a tube, roughened on the outside by a bit or two of wire soldered on, first fixed in the root with a little oxyphosphate towards the apex, and then, say, the other half packed round with amalgam, the calibre of the root canal having been enlarged to allow of it being inserted with ease and certainty. Not only is this method applicable for sound roots, but especially for cases where there is a deficiency of the root substance at the sides, perhaps where the gum has had to be pressed out to expose the surface. The missing wall may be built up with amalgam retained by a groove on both sides, aided by the screw thread or roughened surface of the tube.

In cases where the root is very much hollowed and enlarged, as in those caused by the patient having worn an

ordinary gold pin with plenty of silk on it, but where there is no deficiency at any of the sides, then I think a crown and pin set with oxyphosphate is the best treatment. The tooth is attached to a strong platinum pin, as long as the root will allow. To strengthen and give the necessary roughness, I used little wings of metal soldered to the pin, but lately have adopted the method described by Dr. Meriam in the *Cosmos*, of putting a spiral of wire round it, soldering with gold. Two or three breakages of the pin had previously occurred when I used the ordinary gold pin, very slightly nicked, as holdfast for the cement. The plate covering the root should be fitted closely over the edges, so that nothing but the slightest line of cement may be exposed. Where the root has not been hollowed to the edge, I think it is best to cup the top of the root, so that there may be a fair body of the oxyphosphate close to the edge all round; otherwise, if squeezed out between two flat surfaces, the thin wafer thus produced is apt to be disturbed in the trimming up, especially if the operator is at all hurried, or it may become broken up and disintegrated afterwards, leaving a distinct place for the lodgment of *debris* behind the plate and the top of the root. This method is at once very simple, and in suitable cases very satisfactory. When the tooth is ready to be inserted, the root should be thoroughly dried and ready for the reception of the oxyphosphate, not too quick-setting, a portion of which should first be put up the root and another portion round the pin and under the plate, taking care that every part is covered to some extent with it, which will ensure the surplus cement being pressed out equally all round. At the moment of writing I recall one case of a very hollow central set some six years ago, and seemingly as good to-day as then; a similar root filled with amalgam would, I imagine, have a strong tendency to necrosis.

The above are the principal methods employed in treating cases of the first class, namely, incisors and canines.

2. *Bicuspid and Molars*.—In crowning these teeth I

have done comparatively little, in fact I have not gone further back than the bicuspid, and it is to these teeth I will therefore confine my remarks. With them there comes more often than any other the question of retention of part of the tooth; thus it is of common occurrence to find the outer cusp broken off and the inner one left. This some advise retaining, fitting a canine tooth to the outer edge, soldering it to a post and filling round it with amalgam, using the inner cusp as a retaining point. The retention, however, of such portions does not seem to me desirable in almost any case, the result not being so strong as in the case of complete removal, and the operation itself is generally more difficult. Unless a very large part of the cusp is left, it is considerably weakened by anchorage for the amalgam. There is also difficulty where the crown is not a large one, as in a case of a lady I had some years ago, when I set the post in the root with Weston's cement, and built up the remainder with amalgam, but it was no easy matter, on account of want of room, to pack it round the post and between the natural and artificial cusps. It happened in this, as it happens in similar cases, that the natural cusp broke off, while the artificial one remained, showing what is really the weak part in such an operation.

There can be little exception taken to the Bonwill crown, or some of the slight modifications of it, for use in the case of bicuspid. Where the bite is close, of course they are not suitable, but where there is a fair amount of room they serve the purpose well, being strong and easily adjusted. For these crowns, amalgam of a quicksetting order is the best material to employ, using either the ordinary Bonwill pins set to the roots, or what I prefer, especially in shallow crowns, the Howe screw post with nut. When the latter is used it is advisable to take the Howe dovetailed crown, which has a large opening for the reception of the nut. The root is first tapped in the centre and the post screwed in, amalgam is then packed round it over the surface of the root; then the crown is slipped over the

post, and some amalgam having been packed round it, the nut is screwed up and covered with more amalgam. It is not always possible, when the bifurcation of the roots occurs not very far up, to get sufficient anchorage for the screw, and in the endeavour I went through in one case, without, however, any harm resulting, the hole being covered with a gold cylinder dipped in strong carbolie, and the screw was put in deep enough to hold quite well. In fact, the Howe screw, which has a sharp cut with shallow broad space between, holds with remarkable strength in dentine, and the short pieces cut off serve the purpose of retaining screws for contour fillings. On one occasion I found this screw nut method very useful in the case of an upper canine, which helped to support a plate. The crown was broken off and the root was exceptionally small and short, so I put in a screw post and a crown with a large opening in it, into which the nut went. It has now served the purpose well for two years.

Where there are two distinct roots, the plan of a closely-fitting cap with two platinum pins, roughened as before described, and set with oxyphosphate, is an excellent one in many cases, especially in those where the bite is close, and will not admit of an ordinary shaped crown. A gold cusp may also be built up to any height to suit the hole. Theoretically, at any rate, a band or any collar might be used in many cases of bicuspid roots, but as I have had no practical experience of their application, I forbear to say anything further in regard to it, but will leave it to those who have employed it or have seen the results of the practice. I am sure we should like to hear from our American friends, shall I call them, who may be able to speak from what they have seen of the extent of this practice, and whether many practitioners are opposed to it, as certainly some are.

It may be seen now that, as I am beginning to speak of methods I know not of, I am tending to stray beyond the limits I commenced with, so it will be wiser for me to

bring these somewhat discursive remarks to a close. I only hope they may have been of some interest to you, and that you will freely give your own experience in the discussion.—*Dental Record*.

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## ARTICLE II.

## IMMEDIATE ROOT FILLING.

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BY, H. A. SMITH, D. D. S., CINCINNATI, OHIO.

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[Read before the Mississippi Valley Dental Association, held at Cincinnati, Ohio, March 7, 1888.]

If we were called upon to fill root canals only in teeth from which healthy pulps had been removed by surgical means, I presume the system of "Immediate Root Filling" would be generally adopted. Cases presenting this favorable condition are, however, comparatively rare, and the dentist finds pulps in all stages of inflammation, decomposing and dead pulps, complicated with disease of the peridental membrane and alveolar abscess, either acute or chronic. It is due to this variety in the cases presented, that practitioners necessarily differ in their methods of treatment and in what they regard as the proper time for permanently stopping a root. If there were no other reason for these differences in practice, they would naturally result from temperamental differences in dentists themselves. The late Prof. James Taylor, when speaking of this subject, would say, that we have a class of good practitioners who are forever treating a pulpless tooth; they appear to recognize favorable conditions, but for some reason have not the courage to fill the root canal permanently, fearing possible subsequent trouble.

The typical immediate root filler of our day certainly shows no timidity in this direction; indeed, his courage



seems oftener to run away with his judgment. He is ambitious not only to annihilate space, but time also.

The most favorable cases are those in which the pulp has been removed by surgical means, leaving at the apex of the root simply an incised wound, which will heal by first intention; and in this condition, if proper aseptic precautions have been observed in the removal of the pulp, we may fill the canal immediately, with little or no danger of irritation occurring in the apical space. When arsenious acid has been used and the irritant effects of the arsenic have been confined to the pulp, as shown usually by the slight pain attending its removal, we may also, with comparative safety, proceed to fill at once. If, however, in taking away the pulp any considerable hemorrhage follows, that is not arrested spontaneously, it is not best to fill at the same sitting. The application of carbolic acid or the usual styptics to hasten coagulation, will cause more or less injury to the tissues about the apex, including irritation. The better practice in such cases is to leave the clot that has been formed, in contact with the wound until healing has commenced. The blood clot is nature's own dressing and completely filling as it does the root canal, effectually prevents infection from without. By placing an antiseptic cotton dressing in the canal, in contact with the clot, decomposition of the blood will be prevented for several days. In from twenty-four to thirty-six hours, the clot may be removed without disturbing the layer of granular tissue which has formed, and since an antiseptic condition of the root has been maintained, we may, after careful washing proceed to fill permanently. Ordinarily in chronic cases of alveolar abscess with fistula, where systemic conditions are favorable, the root may be filled permanently after thorough cleansing of the pulp cavity and sinus with peroxide of hydrogen, followed by a mild antiseptic such as a dilute solution of carbolic acid or bi-chloride of mercury.

It is in the management of those cases in which the

pulp, having been gangrenous, and as a source of infection for a long period, has caused abscess, with discharge either through the root canal or alveolus, that a radical difference in practice prevails between the conservative practitioner and the advocate of immediate root filling. The statement that all roots can be made aseptic by treatment at one sitting we cannot accept. We have all seen how readily the dentine and cementum of roots of teeth take up coloring matter from the old-fashioned copper amalgam with which they have been filled. If this coloring matter will thus penetrate these dense tissues, certainly septic matter from a pulp that has long been gangrenous will thoroughly infiltrate the tissues of the root, often reaching the peridental membrane. We can then hope to counteract sepsis in these cases only by repeated washings with disinfectants, followed each time with an antiseptic which will not combine with organic matter in such a way as to prevent the effects of subsequent treatment. When we have decided to fill the root, the use of a powerful coagulator, such as chloride of zinc, as a last dressing is indicated. This "cooks" or "vulcanizes" the albuminous matter and renders it, as it were, fixed material. When oxychloride of zinc is used to fill the root, this effect is produced by the zinc chloride in the material.

The attempt to obtain an aseptic condition by burring out the root canal in which the pulp has been in a putrid condition for some time, would it appears be idle; as would also the practice of correcting sepsis by introducing into the root canal the point of a heated instrument.

Those who advocate immediate root filling it appears place great reliance upon what is termed, "*vis medicatrix naturæ*." This recuperative vitality is, in the mouth, as in all parts of the body, an unknown factor, and cannot be measured accurately. Since the source of contagion in these chronic cases is not confined to the pulp chamber, we would do well to keep the root canals open until we have some better evidence of cure than the cessation of dis-

charge through the external opening, which may follow a single treatment. Granulation tissue may form in the apical space, and along the walls of the sinus and the fistula may heal; yet a cure is not certainly effected. The balance between health and disease which obtained for a short time, has turned on the side of disease; the new tissue formation gives way and we still have a chronic case of abscess. May we not treat such an abscess through the opening in the gum after having filled the root? We may; but not nearly so effectually as when the opening is maintained through the root.

In cases of blind abscess and other trouble following this hasty method of treatment, the surgical procedure of drilling down upon the abscess is freely spoken of as an effective and easy operation. In all surgical treatment two people are to be considered, the operator and the one operated upon. The immediate root filler in the zeal of his universal method, seems to have left out of consideration the person upon whom he inflicts the wound. Besides the uncertainty of affording relief by drilling through the alveolus in cases of forming abscess, is the disagreeable fact that the operation should be performed at the most painful stage in the inflammation, that is, just before the formation of pus.

The papers and discussions which have appeared on this subject in the last two years have, at least, had a wholesome effect upon our daily practice. It has resulted in the adoption of better methods of antisepsis and a stricter cleanliness of both the operator's instruments and person; the action of certain medicaments has become better known, and the relative potency of a great number of antiseptics carefully studied. More exact methods of root filling are being practiced, and we shall, no doubt, in the future have more uniformly good results in our efforts to save pulpless teeth.

#### DISCUSSION.

Dr. Atkinson spoke of the septic condition of roots

and the necessity of cleaning to, and often beyond the apex. He stated how uric acid accumulated and the necessity of its speedy elimination from the system.

Regarding immediate root filling, if there is no periostitis he said to go through the foramen and fill immediately, as it is not necessary in most cases to wait any length of time. In alveolar abscess we get suppuration and hyperplasia. After speaking of these and pus formation, he said to relieve the patient from severe pain, while opening up an abscessed tooth, to tie a strong cord to the neck of the tooth and request the patient to pull on this and not loosen the hold. If the pain is still felt, request him to pull a little harder, and keep this up until you have drilled through the foramen; and if you go beyond the apex it will do no harm.

He here spoke about disinfecting being carried to extremes, and that he had years ago used bichloride of mercury for disinfecting in the same manner as that of the present day, for all it is now used *scientifically*.

He said he did not go much on micrologists. He used to be one of them himself. A man that has been to camp meeting and been converted six or seven times generally knows what he is talking about.

In regard to arsenic, or arsenious acid, he said it has no affinity for the tissues and does nothing but take the place of the pabulum in the tissues.

Dr. Watt: After all, the point to be gained in practice is for a man to question himself, and if he cannot answer his own questions and understand himself, he is not fit to act.

Regarding the patient you should not be satisfied until you have inquired of his family history. Perhaps not satisfied with this you may inquire into other things such as constitution, habits, etc. If he has excessive habits as smoking, beer drinking, and the like, do not operate immediately. You must know all of these things before operating, if you want to be successful.

Dr. Conrad: I treat these teeth and in almost all cases fill immediately. After examination wash out the cavity with peroxide of hydrogen and go carefully to the end of the root, and when you know it is clean, fill it. When you find a molar with a calcarious deposit in the pulp chamber, you may think there is no opening into the root canal, but there is, and unless you go through this you will be liable to have trouble. When a root is filled to the apex perfectly with a hard substance, you should never have any trouble. My creed is to wash out the cavity thoroughly with warm water and then peroxide of hydrogen. Be cleanly, thorough, and open into every root canal. Never let a cavity go unfilled where there is a bit of pulp tissue, and never let a root go until it is filled to the end.

Dr. Jay: The gentleman says never leave a portion of a root unfilled. I would like to inquire how he serves the molar roots?

Dr. Conrad: I cut through the crown, where I can, or even through the side just so I get into them. Perhaps we experience more trouble to find the opening in the anterior buccal root of the superior molar than any of the others. Where a root is tortuous, you must not drill straight or you will penetrate the side of the root and have trouble. It is best to go about one half or two-thirds of the length of the root, then with a smaller Morey drill continue a little farther, then use Swiss broaches; keeping the canal flooded with peroxide of hydrogen. When this is carefully worked into the root the effervescence causes the infectious material to be thrown out of the root toward the pulp chamber and not through the apical foramen. Where there is a deposit in the chamber, and you cannot find the opening into the canals, place a little of the Herbst obtundent in the tooth and leave it until the next day, and if necessary repeat the operation until this covering is dissolved away and the opening is exposed.

Dr. Sage: Care should be used in the injection of

medicaments into the substance of coagulated lymph or cellular tissue, for inflammatory action is liable to be set up. We often force the medicament through the root to the so called pyogenic tract and get irritation and what we call over-treatment. I think it is not necessary to force any of this medicine through the root unless there is a sinus. The root canal should be kept flooded with antiseptics, and more precaution used if there is no fistulous opening. We should consider the question of diathesis of the patient, as there are certain symptoms we may recognize if we are observing. If a person has high cheek bones, is of stout build with a short neck, and has long bones, it points to a scrofulous diathesis. We have other indications of this in persons of a nervous or sanguine temperament, as those with red or sandy hair, light complexion, long slim necks, and flat chests. In these subjects immediate root filling is not advisable.

Dr. Ames: I believe that where we have no acute inflammation at the time, we can thoroughly remove the contents of the canals and fill immediately. In regard to iodide of potassium I have been in the habit of decomposing it by the galvanic current. Place the negative pole against the face of the patient, or let him hold it in the hand, and place the positive pole on the tissues where you require the decomposition of this substance. My method of disinfecting root canals is to take a Swiss broach, gold plate the point to prevent oxidation, attach to or hold in contact with the positive pole of the battery, and work it carefully and slowly to the apex of the canal, decomposing the iodide and thoroughly disinfecting. Then cleanse and fill the root immediately.

Dr. Jay: I have found nothing better than gutta-percha as a filling material for root canals.

Dr. Taft: There is wonderful unanimity in all these discussions. Every one has said he thinks that roots may be filled as soon as they are ready to be filled. This cannot be denied. We have a great variety of cases presented

to us, and we must, as Drs. Watt and Atkinson have stated, take the accidental changes into account. If a patient presents himself and the surrounding circumstances are favorable, you can fill at once; but if a portion of pulp tissue or decomposed matter remain, it is not advisable to do so. Test this by placing a small pledget of cotton into the cavity and leave it for several minutes, then remove. If the cotton smell offensive, and you close up the cavity, you will be liable to have trouble. If there is diseased tissue that needs to be disposed of at the end of the root, break it up. If this is not necessary, get the root into the best possible condition and seal with chlora percha, being careful to avoid pressure. Care should be exercised in using carbolic acid. It is used too much. Apply the dam and use hot air as a coagulator. All these and other things should be taken into account before filling.

Dr. Fletcher had a failure to report. A man who had taken whiskey, and perhaps quinine, had a superior right lateral that had been sore for five years but had given no particular pain. It needed refilling, and in taking out the filling he found the pulp chamber empty. There was a slight odor and soreness. He used peroxide of hydrogen, as Dr. Conrad suggested, carefully filled the tooth, and dismissed him. The next day he returned suffering from the effects. He punctured the alveolus, got a discharge of blood which relieved the patient somewhat, but to-day that man is in bed.

Dr. Sage spoke of peroxide of hydrogen, its action, etc. He then referred to the treatment of root canals with chloride of zinc to coagulate the albuminous materials.

Dr. Atkinson: When treated in this way, hydrochlor.-zincate-of-albumen is formed. On removing this from canals, I have found it to be clear as glass, and have said that I did not know of a more perfect filling, but how long it would remain in this condition I do not know. He spoke of gaseous bodies penetrating the tissues, and that he had seen blood abscesses which required a long treat-

ment and gave all the symptoms of necrosis. Such cases usually succumb to a solution of salt and water followed by applications of aromatic sulphuric acid. In treating diseases where the system needs toning up, he had found McKesson & Robbin's preparation of nux-vomica and phosphorus cantharades of value. Take a two-grain capsule of sulphate of cinchonidia twice a day, and one pill of the nux-vomica preparation at night. This gives the system tone, and then your other medicines will take hold.

When a pus abscess is treated with peroxide of hydrogen, we get a creamy mixture and effervescence. You can prove the action by applying a heated instrument. If carbonic acid is generated, the instrument is colored black; if oxygen is present, the heat is increased; and if you get a flame, it indicates the presence of hydrogen.—*Ohio Journal of Dental Science.*

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#### ARTICLE III.

### ROOT MEDICATION.

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BY S. ESCHELMAN, M. D., D. D. S., L. D. S., BUFFALO, N. Y.

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[Read before the Buffalo Dental Society, December, 1887.]

Before considering medicaments used to destroy the septic products due to the putrefaction of the dental pulp, which, if not destroyed, produce, by mechanical irritation or septic infection, inflammatory action in the highly vascular tissues which constitute the root membrane, it will be well to consider some of the conditions which make it imperative to treat a putrescent pulp chamber.

Writers usually mention only one point of egress to the peridental membrane for septic matter. I believe such a statement to be faulty, for two reasons: 1st—if such were the case, the mere hermetical closing of the apical foramen would be sufficient to protect the vascular struc-



tures surrounding the root; 2d—clinical experience teaches us that such treatment soon receives a vigorous protest from the peridental membrane. Now, this being the case, let us see if the microscopic anatomy of the tooth does not show us another way of access to the peridental membrane. If we direct our attention to the manner in which the dentinal tubuli terminate, we find that they terminate in three ways: 1st—in loops; 2d—with the spaces of the granular layer; 3d—with the canaliculi of the cementum. We have, therefore, a direct continuation of living matter from the pulp to the peridental membrane, through the dentinal fibres connecting with the cells which occupy the lacunæ and canaliculi of the cementum.

Stowell believes that the dentine and cementum have a regular lymph canalicular system; corresponding in a general way, with the lymph canalicular system of the whole body. He says that neither the dentinal fibres in the dentinal tubuli nor the cells in the lacunæ and canaliculi of the cementum, nor the protoplasmic masses in the interglobular spaces, quite fill the space allotted to them, but leave room for the flow of lymph about them. By admitting that lymph spaces exist in the dentine and cementum, we can easily understand how septic matter,—due to putrefaction,—that is so injurious to the integrity of the peridental membrane, can enter; also why such agents as arsenic will destroy the pulp, when applied to the tooth with a thick layer of intervening dentine.

As to the medicaments which are chiefly used in placing the pulp chamber and its environments in an aseptic condition, I will consider their therapeutic value in meeting the three pathological conditions found in a putrescent pulp chamber; namely, 1st—their power of destroying the products of putrefaction; 2d—their power of destroying the agents of putrefaction, fungi; 3d—their power of coagulating or incorporating themselves with the dead remains of the dentinal fibres.

Regarding the products of putrefaction; sulphuretted

hydrogen gas is the only one with which we will have to deal, and we find that the medicaments which act as true deodorants are those that contain chlorine, iodine, bromine, and oxygen, and some of the metallic salts; all of which decompose the sulphuretted hydrogen, forming solid or liquid compounds with it. Deodorants containing metals or bromine are not applicable as disinfectants of the pulp chamber. Only those containing chlorine, iodine and oxygen are useful.

In considering iodoform we include iodine also, as we know that it parts readily with its iodine when in solution, or when exposed to the sun or daylight in the presence of fats, by the application of heat or oxidizing agents, or in contact with blood. Nascent iodine decomposes sulphuretted hydrogen by uniting with the hydrogen, forming hydriodic acid, the sulphur being precipitated. Bichloride of mercury is another medicament which will decompose sulphuretted hydrogen, forming the black sulphide of mercury and hydro-chloric acid.

In peroxide of hydrogen we probably have our best and most elegant disinfectant. It is a very unstable compound, readily yielding its extra atom of oxygen, which proves destructive to sulphuretted hydrogen gas by its union with the sulphur, forming dioxide, and the elimination of free hydrogen gas. Carbolic acid, creosote, eucalyptus oil and the essential oils have no effects as true deodorants, but accomplish the object, if an opening is left for the escape of sulphuretted hydrogen gas, by virtue of their therapeutic value as medicaments, thus remedying the second pathological condition mentioned, namely, the presence of the agents of putrefaction, fungi. All of the deodorants mentioned, with the exception of peroxide of hydrogen, are antiseptics which stand at the head of their class.

After complete disinfection and sterilization of the pulp chamber and its environments, we come to the consideration of those medicaments which meet the third patholo-

gical condition mentioned, namely, those which coagulate or incorporate themselves with the dead albumenoid matter contained in the dentinal tubuli. After having established an aseptic condition, I believe it to be very important to use remedies which will keep the dead matter in the tubuli in an aseptic state, and antiseptics that form insoluble compounds with the dead matter by coagulating the albumen are the remedies to be selected.

Some have objected to the use of remedies that coagulate albumen, on the supposition that the pulpal end of the tubuli becomes closed and does not allow the medicament to penetrate to the terminal ends of the tubuli. Now this is a misstatement, which can easily be demonstrated by coloring carbolic acid with carmine and keeping the pulp chamber of a tooth filled with the acid for a few days; when it can readily be seen that it has permeated the tubuli to their terminal ends.

If we were to reject the medicaments which coagulate albumen we would be obliged to reject nearly all of our best antiseptics; as bichloride of mercury, nitrate of silver, carbolic acid, and chloride of zinc, all coagulate albumen. Iodine and iodoform will not coagulate albumen, but will incorporate themselves with it. Iodoform, while it is one of our best remedial agents in the conditions mentioned, possesses another valuable property in common with carbolic acid that the other medicaments mentioned do not possess: namely, anæsthetic properties, which, in my judgment, give it precedence in the conditions mentioned when complicated with vascular disturbance of the peridental membrane.—*The Dental Advertiser.*

#### ARTICLE IV.

### ON SOME CASES OF CONGENITAL FISSURES OF THE MOUTH.

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BY J. BLAND SUTTON, F. R. C. S.,

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In 1867, Sir William Fergusson, in his well-known lecture on Hare-lip and Split Palate, states "that hare-lip in the human subject bears no resemblance to that of the hare. In this animal it is invariable in the middle line; in man it never is." Among the many cases which this surgeon saw, none were in the middle line.

Mr. Holmes, commenting on this statement, amends it thus:—

"The natural cleft in the lip of the hare differs from the unnatural cleft in the human lip in the important particular of being in the middle line, which the human hare-lip never is, or so rarely that it may practically be said to exist."

It is also equally noteworthy that in hare-lip occurring in mammals the cleft is commonly situated to the right or left of the median line.

A similar condition is present in the lip of the lamb presented to the Museum of the Odontological Society by Mr. Willoughby Weiss. In this specimen the fissure is on the right side. Although one would imagine hare-lip to be fairly frequent in the lower mammals, to judge from its prevalence in the human kind, nevertheless the two cases just mentioned are the only actual specimens I can refer to at the present moment, and no other recorded cases are known to me.

Median hare-lip, however, occurs in the human subject, and the specimen, for which I am deeply indebted to the courtesy and kindness of my friend, Mr. Frederick Treves, establishes this beyond all doubt.

On examining the child before its death, I felt convinced that there was no ethmo-vomerine plate, and this

conviction was strengthened by the peculiar shape of its forehead. When the child died, this opinion was fully confirmed; there was no ethmo-vomerine plate, consequently no nasal septum, and, what is more important, the premaxillary bones were absent. The bearing of this peculiarity will be recognised when we come to discuss the embryological features of these fissures.

In the summer of 1866, whilst staying in Paris with my friend, Mr. W. H. Freeman, of Bath, we noticed some pug dogs, kept as fancy pets, with remarkable clefts in the upper lip and nose. A bitch was purchased, and at Bath Mr. Freeman had her crossed with a Skye-terrier. The result was successful; half the pups presented well-formed lips and noses, the other half had cleft noses like the mother.

The deformity consists of a median vertical split involving the upper lip, extending some distance between the nostrils, and passing between the incisive bone, opens on the hard palate.

The defect is of great interest; for median hare lip is excessively rare, and even in the hare the mesial cleft is confined to the lip, and does not involve the nose. It is also interesting in that it serves as a good example of a defect being transmitted until it becomes an established condition. It is very difficult to explain, on the ordinarily received opinion regarding the development of the nose and upper lip, how this defect comes about. An examination of the lip of a normal dog, however, shows that the cleft, or cicatrix, present in the dog's upper lip, extends some distance along the nasal septum. Hence it is possible that we have in this case to deal with an arrest of the coalescence which normally takes place in this situation.

Equally true is median fissure of the lower lip, not only in man, but in mammals. Sir William Fergusson figured an example of this defect, the only one he ever saw in his exceptional experience of these cases.

An excellent example of median fissure in the lower

lip, involving the symphysis and tongue of a calf, has been placed on record by Dr. Joseph Walker. A very remarkable specimen is recorded by Lannelongue. It was observed in a child two years and a-half old. The split involved the lower lip, and between its edges a tumour existed. This was removed, and the edges brought together. The lower incisors were natural.

Judging from the figure accompanying Lannelongue's account of the case, it would seem to be a dermoid, and to that variety to which I have applied the term sequestration cyst.

Before proceeding to discuss some points connected with the development of the parts under consideration, we must study yet another example of abnormal fissure, viz., *macrostoma*. This congenital defect is due to failure of union, partial or complete, of the mandibular fissure beyond the natural limits of the mouth.

Through the courtesy of Dr. Rayner and the kindness of my friend, Mr. John Palmer, I have been able to study and exhibit a remarkable specimen of this rare defect.

In this instance the child, when born, was found to possess an unusually large mouth, the angles of which gradually passed into a red cicatrix. This scar in its turn ended in a gasping recent wound over the temporal region extending over to the dura mater. The condition was symmetrical.

The impression left on the mind of those who saw the case was, that the injury had been caused by a tight amniotic band engaging the mouth at the time of birth and impending delivery, especially as the nurse's attention had been arrested by a strong cord-like piece of amnion. This opinion, however, cannot be entertained.

Recently, through the kindness of Mr. G. Seymour, an opportunity has been afforded me of studying a very interesting instance of what may be considered the mildest form of the defect. The patient, a little girl aged seven years, presented on the right side of the cheek, an inch and a-half

behind the angle of the mouth, a small depression surmounted by a tiny cutaneous nodule. The depression in the skin was about one-sixteenth of an inch deep. Corresponding with this, on the mucous membrane of the mouth, was a white cicatrix one-fourth of an inch in diameter.

On the left cheek, an inch and a-half behind the angle of the mouth, is a small congenital cutaneous elevation. The pinna on this side is very defective, and as far as my examination extended, the external auditory meatus is covered with skin; but I do not think the meatus is completely occluded, because the girl has some hearing on that side.

The case is one of extreme interest, and may be interpreted as follows:—

The dimple on the right cheek and the nodule in the left one result from the faulty closure of the edges of the mandibular cleft, in the same way that imperfect coalescence of the branchial fissures leads to the formation of cervical branchial fistulæ.

Macrostoma is, as has already been mentioned, frequently, but by no means always, associated with defects of the auricle. It is of great interest to find in this case the defects in the line of the mandibular cleft associated with an abnormal auricle.

As far as my knowledge of the literature of this subject extends, this is the only recorded case of a congenital depression in the cheek allied to branchial fistulæ.

Some amount of new light appears to have been shed on this matter by His's careful investigations into the anatomy of early human embryo. This writer's account is somewhat after this fashion:—The mouth in a human foetus of the fifth week is represented by an opening from which five fissures radiate. The upper pair are the orbito-nasal, the two lower form the mouth, whilst the median fissure separates the lower jaws. As the median process develops to form the nose, two rounded prominences make their appearance at each angle. These may be referred to as the

globular processes. From the globular processes the alæ of the nose and intermaxillæ are derived; later they are joined by the lateral pieces to complete the lip.

He further points out that in some mammals, especially the rodents, the globular processes do not fuse together, but are permanently separated; whereas in man they always fuse together in the middle line, but are not so constantly joined by the lateral pieces.

These facts are of value, inasmuch as they afford a ready explanation of the occurrence of median hare-lip in the lower mammals, but its extreme rarity in man. When it occurs in man it is due to an arrest of development of the globular processes. Hence we may fairly infer that, in the variety of pugs already referred to, the globular processes habitually fail to coalesce in the median line. It is open to question whether the globular processes owe their origin entirely to the fronto-nasal plate. The case of median fissure, which has been mentioned, would seem to show that the premaxillæ arise in connection with the ethmo-vomerine plate, and that the skin covering them is derived from the fronto-nasal plate; for in that specimen the alæ nasi are well-formed, but the premaxillæ and septum are absent.

Hare-lip in man is not necessarily accompanied by a split palate, but if cleft palate is associated with hare-lip, the cleft involves the entire palate. If His's view concerning the globular processes is correct, then it would be expected that hare-lip could be associated with a cleft involving only the premaxillary bones.

Whilst studying these abnormal fissures about the mouth, a marsupial embryo (*Macropus*), which could only have been in the pouch two or three weeks, came under my notice, and the condition of its mouth is so interesting that I have had it drawn. It presents a median cleft in the upper lip, which differs from the hare's cleft in that it involves the premaxillæ exactly as in the case of the dog. Further, there is a shallow median fissure in the lower lip. A similar condition exists in the lips of all early marsupial embryos



I have been able to examine (*Macropus*, *Halmatura*, *Phalangista*, *Petrogale*).

It may be briefly stated that the fissured lip of the calf and lamb are the result of non-coalescence of the globular processes with the lateral bars which form the lips and maxilla. This, of course, applies to such cases in man. The fissure in the lip of the hare is due to the non-coalescence of the globular processes with each other, an event quite normal in this mammal, as in rodents generally; in the case of the pug, with median cleft in the lip and nose, the failure of union between these processes is a defect hereditarily transmitted.

Macrostoma is due to failure of union in the posterior part of the oral cleft, whilst the median cleft in the lower lip, an event of very rare occurrence, is due to some cause preventing the mandibular bar from fusing in the median line.—*Dental Record*.

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#### ARTICLE V.

### CONSERVATION OF THE DENTAL PULP.

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BY J. R. CALLAHAN, D.D.S. HILLSBORO, O.

[Read before the Mississippi Valley Dental Association, held at Cincinnati, O., March 7, 1888.]

For ages the dental pulp has been the subject of much speculation. At the present day, at almost every dental society meeting, more or less is said of the treatment of this very delicate organ. In almost every dental journal of the day, more or less is said of the protection or destruction of the dental pulp. Oftentimes the speakers or writers, as the case may be, are so positive of the supremacy of their methods or theories that they will listen to no arguments contrary to their expressed opinions. At one time the conservation, or the saving or protecting of the dental pulp,

seemed to be the only recognized practice, and it was at the risk of his professional reputation that any dentist dare intimate that he was not able to preserve alive and in perfect health, for an indefinite length of time, every scrap of nerve tissue that might remain in any tooth that was placed under his professional care. Of late years a reaction seems to have set in, until to-day it seems, in some quarters, we have reached the opposite extreme. At the last meeting of the Ohio State Dental Society the devitalization theory appeared to reign supreme. Let us hope we have done with extremes and may each and all of us find our level on this very important point.

It is the object of this paper, 1st, to provoke discussion; 2nd, to direct your attention to a plan of procedure that has proven more satisfactory to the writer than any method yet tried. Please to note we do not claim perfection, to be perfect we should be able to attain the excellency claimed by some of the enthusiastic pulp cappers of 1886-7. Not having reached the dizzy heights of those days, let us compare notes and see what we have accomplished. To save going into tiresome details and to make our position somewhat clear, I will say at once that in practice I do not attempt to cap more than *one* exposed pulp in *ten*, believing that the arsenic should be applied to all pulps that cannot be restored to perfect health. It is my desire to call your attention more to the treatment and filling of deep seated caries, or near exposures of the pulp, if you please. In a large per cent. of the mouths presented for treatment you find the decay has penetrated the tooth to such a depth that, if all the decayed dentine was removed the pulp would be exposed. In fact, it is generally the case that the *pain* in *this* class of cavities is what has sent the person to the dentist. The teeth most likely have been giving trouble for some time. Such a case, as you all know, needs careful and intelligent treatment. We should bear in mind that we have to deal with a very delicate organ confined in a narrow, bony chamber; an organ, that

while it is devoid of tactile sense, will not bear compression in the slightest degree, and is *extremely* sensitive to thermal changes. Having these most important facts in mind we may proceed to the treatment of these deep seated cases. Great care should be exercised to prevent uncovering the pulp, being careful at the same time to not leave too great a thickness of decay over the pulp. The debris should always be removed by a gentle stream of warm water. After preparing the cavity and applying the rubber dam, the layer of partially decayed dentine over the pulp should be thoroughly sterilized, using for this purpose 95 per cent. carbolic acid, having the acid about the same temperature of the tooth; dry the cavity thoroughly, using alcohol and warm air, then cover the decayed dentine with a thick paste of iodoform and carbolic acid, or oil of cloves if you prefer, over this flow a thin paste of oxyphosphate of zinc and give this plenty of time to harden when the filling may be completed with cement or gutta-percha. These fillings should be allowed to remain in the tooth until you are satisfied that there is no irritation or inflammation in the pulp tissue. I have treated in this manner teeth that had been aching two or three days prior to and at the time of treatment, with most happy results. But a few days since I opened, for examination, a 'sixth year molar that had been filled in this manner for two years. The tooth was aching slightly at the time it was filled; upon removal of the cement filling found the iodoform dry and apparently full strength, the tooth had been perfectly comfortable all the while. The nerve, as far as I could determine, was in perfect health.

I follow almost the same treatment for capping *exposed* pulps. That is, all pulps that I believe to be in good condition. You will observe that I here pass a very important point, viz., the restoration to health of diseased pulp tissue. A case in practice will perhaps be of interest. Miss D. presented herself for treatment complaining of pain in the right superior canine. Upon examination

found a large cavity on distal surface of that tooth, found also a small exposure of the pulp. The decay was carefully removed, a paste of iodoform and carbolic acid placed upon the exposure, a metal cap was placed over this to prevent pressure, and in this case the cavity was filled with cotton and sandarach varnish. All pain disappeared in a few minutes after the application was made. The tooth was allowed to remain in this condition for a week, when the lady returned. Found upon examination the pulp, to all appearances, to be free from irritation; rubber dam was applied, tooth thoroughly dried, paste of iodoform and carbolic acid placed over the pulp and a thin paste of oxyphosphate of zinc flowed over this. After this had hardened the cavity was filled with cement to remain two or three months, when, if there has been no unfavorable symptoms, the tooth will be filled with gold, leaving, of course, the cap as it is at present.

I recently placed a gold filling in a right superior lateral incisor in which the pulp was capped as above described. On March 17th, 1882, I found this pulp after six years trial to be in perfect health.

As to the medical properties and action of iodoform, Gorgas tells us that it has no irritant action, and in small doses is tonic, stimulant, anodyne, alterative and disinfectant; also antiseptic and has great influence upon the nervous system. It is not necessary, in this connection, to mention its toxic effects, on account of the small doses that must be used for want of space in cavities if for no other reason. He tells us also, that when the surface of an ulcer or wound is covered with a layer of iodoform in crystals, a certain degree of absorption of the fluids secreted takes place. The products of secretion penetrating these interstices between the minute crystals of iodoform soon loose the liquid form and produce with them an impermeable crust, and under this crust cicatrization soon occurs without any retraction of this tissue.—*Ohio Journal of Dental Science.*

## ARTICLE VI.

## TUMORS OF THE MOUTH AND JAWS.

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A. E. BALDWIN, M. D., D. D. S.

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[Read before the Chicago Dental Society, February, 1888.]

As stated by the speaker a few months ago, he had labored under the delusion of being allowed to choose his own subject for his paper, and has chosen one, and worked upon it a long time. The subject assigned in this instance is one of which the writer has but little knowledge. But realizing that many come to the society to hear papers on the listed subject, and possibly loaded with much that is of interest in the discussion of the same, he determined to adhere to the adopted plan, and write on the subject assigned, hoping that at another time he may be allowed some choice. In advance he wants to state that this paper will consist largely of the thoughts of others, given as briefly as possible, and the original matter will be infinitesimally small, save in the latter part of the paper, where the writer has to strain a point to bring what he says under the head of "Tumors of the Mouth and Jaws."

The general term "Tumor" covers the ground of any swelling or abnormality in excess of normal size in any tissue. However, the term is generally used when the enlargement is accompanied by pathological conditions. The tumors of which we speak are in the hard or bony parts, and in the soft or fleshy tissues. We may with propriety divide them into two classes, those produced by local causes or conditions, and the other by outside or foreign influences.

The first class are of necessity benign in their character, and the second class may be either benign or malignant. In the proper diagnosis of these growths or developments it has long been a rule in surgery that the

normal tissue must be understood; hence the necessity of every dentist being a careful and observant examiner in every mouth—not only of the tissue, the treatment of which calls the patient to him, but of all the tissues in the range of vision, so as to be able to recognize the normal condition. For if the examiner is ignorant of the normal he cannot expect to understand the abnormal.

When the natural is clearly understood, then the diagnosis of the unhealthy parts is made easy by the process called exclusion, and oftentimes a diagnosis may be arrived at in this way—that would be impossible in any other way. The writer does not wish to be understood as saying that all conditions are easy of diagnosis, for often it baffles the most skillful; and in this matter, as in all others pertaining to our specialty, those succeed best who use judgment and thought as to cause and effect, and he thinks the tendency of all is to examine to find proofs of substantiation of preconceived notions. The true scientist is the one who disarms himself of this, and examines with an eye only to the histological and pathological conditions; and as a rule, when the condition and the cause is understood the treatment suggests itself.

In the first division of tumors we may have exostosis—its name describes its nature; Sarcoma—this quite rare, and then the most common, cystic tumors of the jaws, many times produced by morbid enlargement or dilatation of the dental follicle. These occur in the alveolar ridge, and sometimes attain a great size. The contents are usually liquid, or gelatinous, and occasionally contain rudimentary teeth.

There is another growth, which is developed from the bony or the soft tissues, or from both, with the name Epulis. Virchow suggests that the nature of the growth be added to the term epulis, as epulis sarcomatosa, e. myxomatosa. The greater number belong to the sarcomas, and vary in their character all the way from the round cell sarcoma to the hard, firm fibro-sarcoma. This epulous growth may be

from the osseous, or soft tissues, or more often having its origin from both. The growths are largely made up of giant cells, and usually occur in young subjects. The growth is varied—sometimes very rapid, and at other times very slow. They are very vascular, and this gives them a darkened color. As a rule, they are non-malignant, but the tendency is strong to a recurrence and spreading. When one determines to remove one of these growths care should be taken to remove all, and a rule among surgeons should be remembered, that is, cut away freely till you are positive nothing but healthy tissue remains; and in these cases usually a portion of the bone must be removed. The writer thinks that a fear of too much removal is at the bottom of many of the recurrences, and thinks that very few, if any, of them where everything is removed that pertains to the tumor.

Among the tumors in the soft parts are principally the angiomata—composed largely of vascular tissue—and are often called erectile tumors, and these vary in size at different times; another form, and more rare, are the lymphangiomata, the nature of which is indicated by the name.

Later in life we have *sarcoma* growths, and what has been said in regard to epulis applies largely to this. Carcinoma attacks (in the form of epithelioma) the soft tissues, beginning usually as a small nodule, or circumscribed hard, grayish infiltration of the mucous membrane. Then, we may have tumors as a result of the distension of glands from accumulated and retained secretions. The treatment of these is usually very simple, viz: to open the ducts and allow the contents to escape. Sometimes a lymphatic gland, by inflammatory dilation, gives rise to cystic tumors, known as cystic hygromata; and then various others in mucous structurea in different parts of the mouth, known under the general term of Ranula.

We should be well assured that we understand fully the nature of the growth, or condition of the abnormal tissue, ere adopting any proceeding toward the eradication

of it. The diagnosis can not be made too certain. Sometimes, the writer fears, if this is not remembered, grave mistakes may be made. Where the growth is causing but little disturbance, and developing slowly, or is static, the best treatment is to let it alone. Meddlesome surgery in these cases is often dangerous; provoking, sometimes, a much more rapid recurrence.

In malignant cases, where the growth is of recent origin, or easily bounded, and the general condition of the patient is favorable (and here very much depends upon this general condition)—in such cases an operation should be urged, and the operator must remove freely. In case he makes any mistake, let it be on the side of removing too much rather than too little, for if any of the morbid growth remains it will act as a nidus for future growths, which are usually much more rapid than the original.

There remain many things to say in regard to the general subject—a much longer paper might profitably be written on only one class of tumors—but the writer has spent the time necessary to open quite a field for thought and discussion, and if any entertain different opinions than those expressed, the writer most cordially invites them to express them, and hopes a more general knowledge of this subject may be the result.

Before closing this paper he wishes to mention a condition that, perhaps, properly belongs here, but hardly in the pure field of tumors, being, however, closely allied, viz: tumors resulting in a condition known as alveolar abscess. From the time the writer began to think on the subject of dentistry till now, this subject of abscesses, their causes and treatment, has had a special interest to him, and he thinks that he has never heard anyone speak of a case where, when one had treated, and then filled the roots of a tooth abscessed, if trouble recurred the idea was not conveyed that the recurrence was a result of imperfect work, and where our friends, who live among micro-organisms, would shake their heads and say, these canals were not



made aseptic, or that some of the micro-organisms got away into pastures new, etc., etc. He was struck with the fact that all seem to agree that when the death and removal of the pulp was immediately followed by root-filling, that trouble seldom, if ever, occurred. But if the tooth pulp has been dead some time most dentists seem afraid to immediately fill, claiming they are unsuccessful in so doing—such cases giving trouble. Many claim this as a practical illustration that septic germs have been carried through the apical foramen, and its consequent ills are thus accounted for. You all know how enthusiastic these micro-organism enthusiasts can become, crying Eureka! in every gathering, and from their very assurance causing many to say, Amen! Now, the writer believes that in the main these claims are not true, and challenges them to proof. He has in a simple way experimented sufficiently to feel assured that in many cases where the pulp has been dead some time there has been inflammation of the pericementum sufficient to produce an abscess, and that in very many of these cases there has resulted, from the pressure and infiltration of the purulent matter, necrosis of a portion of the alveolus, generally very circumscribed, sometimes quite extensive.

Now, it may be expected that where this is the case the dead bone will give trouble sooner or later, and usually very soon—when the opening through the tooth is stopped, however perfect the root filling may be; of course, if there is a fistulous opening the change will not be noticed. Now, he believes that when these roots are cleaned out and dried thoroughly, and when filled, no trouble will occur from anything within the root or the tooth, but if care and thoroughness obtains we can tell by inflammations following the work that the trouble is outside of the tooth, and probably there is necrosed bone present. He can illustrate by two typical cases. Case 1: Patient had had a tooth filled, with a resulting abscess; three weeks later came to him; he found a fistulous tract; opened the tooth and carefully cleaned and dried the canals, and filled them and the tooth at the same sitting; four weeks later patient came again and said fistula had not closed yet;

injected cocaine, cut down and removed a scale of necrosed bone; the wound healed kindly, and now, six months later, shows no sign but perfect health.

Case 2: Patient came with only roots of central and lateral left superior incisors remaining; they had abscessed twice, no fistulæ; wished to have them extracted, and, as is the writer's custom, he persuaded the patient to let him fill the roots first, and wait and see the results; patient reported forty-eight hours later with every sign of beginning abscess; he then extracted, and, as usual, found the roots perfectly filled, but on probing into the sockets dead bone was found, and, no doubt, caused the trouble. Here the roots spoken of had been filled forty-eight hours when extracted. Many similar cases might be cited, but this illustrates what is claimed: that, in his belief, in every case that can be dried thoroughly and perfectly filled, no trouble will arise from any condition within the tooth, and that in those cases where trouble arises it is from outside the tooth, and in many, or most cases, is caused by the necrosed bone; and the proper thing to do is to open down upon it and treat from the outside, and bur out the necrosed bone. Some members of our specialty seem inclined to make of this quite a surgical operation, but the writer thinks no professional duty is more simple. He injects about three or four minims of a ten-per-cent. solution of cocaine then makes an incision down to the part, and with a fair-sized bur cuts and then washes out the dead bone. This is all done with probably a mouthful of micro-organism, and usually one operation only is needed.—*The Dental Review.*

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ARTICLE VII.

INTERMITTENT PRESSURE. ITS RELATION  
TO ORTHODONTIA.

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BY LEVITT E. CUSTER, B. S., D. D. S., DAYTON, O.

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[Read before the Mississippi Valley Dental Association, held at Cincinnati, O., March 7, 1888.]

No branch of our esteemed profession has received such an impetus of late as that of correcting irregularities

of the natural teeth. In fact, it has reached such a point that the child has received a scientific name—they call it Orthodontia—and its devotees are wrangling over the priority of invention.

To move teeth in the alveoli, we are dependent upon the same fundamental principle of the animal economy as that by which all change of shape in osseous structures is accomplished, namely: resorption and deposition. The theory was once held that there was an interstitial change, but at present we believe there is an actual digestion and excavation in one portion, and a new deposition taking place in another. During the preparation of the lower jaw for the permanent molars, the ramus is carried back, not by an interstitial development, but by a resorption anteriorly, and a deposition posteriorly. When lime-salts have once been deposited as the basis substance of bone, they, by virtue of their intense hardness and heterogeneous nature, retain that form until reduced by retrograde metamorphosis to the embryonic condition.

Resorption, as a physiological process, takes place under the agency of a class of cells which may be understood to have a retrograde function. They break down tissue already built, and under accidental conditions reduce foreign substances of animal origin to a condition fit for assimilation by osmosis. Such cells, according to where found, have been termed leucocytes, giant cells, osteoclasts or odontoclasts.

The above cells, even though of retrograde function, like all others are brought into action by adequate stimuli. Every different cell requires a special excitation; for the cells of the salivary glands to act, there is reflex nervous irritation originating in the gustatory cells; for muscle cells, motor impulse; for giant cells, a thrombus, an infarct or foreign body; for odontoclasts or osteoclasts, the effort of nature to change the size or shape of a pre-existing osseous structure. Osteoclasts are also stimulated by pressure, and upon the latter do we depend for change of shape in the

alveolar process for correcting irregularities. When nature has once fashioned the alveolus and the arrangement of the teeth to satisfy her own typical demands, we can ask no more of her as a stimulant, but must resort to the other method; namely, pressure. All the forms of pressure for regulating resolve themselves into either of two classes of forces, intermittent, or constant. Under the former may be classed those forces which move to a definite distance and there remain stationary, such as the screw in all its forms; under the latter, constant force, all those which bear with an elastic or continued pressure, such as the spring or rubber bands. Intermittent pressure acts intermittently as such because the space gained by absorption is not followed up immediately by new pressure only as it is applied by the operator.

The method by which giant cells, leucocytes, osteoclasts or odontoclasts, cells of retrograde function, reduce substances has been designated by Dr. Black as resorptive digestion. We understand these cells to have the property of throwing out a digestive fluid which acts as a soluble ferment analogous to that of ptyaline, pepsia, or trypsin. In each case this fluid varies according to the nature of the object to be digested. Krause maintains that in absorption of osseous tissue this fluid is lactic acid. In order to act, these cells arrange themselves so as to be in direct apposition with the part to be digested, they become in actual contact. Implanted teeth, the roots of which are undergoing absorption, contain pits which are lined with odontoclasts. In the formation of sequestra of bone, osteoclasts are found at the line of union of the dead with the living; ligatures are surrounded and crowded with leucocytes. In sponge-graft, granulations are filling up the pores while giant cells are preparing the walls for osmosis, and blood-clots become organized by the presence of connective tissue cells. Dr. Black says, "The osteoclasts are not attached to the surface of the bone or tooth by any mechanical means whatever; they simply lie against the surface and are

detached with the least movement. They act only, however, when lying in contact with the surface. Any intervening substance whatever will prevent their action."

From the foregoing it is evident that the action of osteoclasts may be lessened or entirely suspended by either of two conditions; dilution of the digestive fluid, or separation of the cells from the point of absorption. When resorption is produced artificially, and it is agreed that pressure is necessary to stimulate osteoclasts, as the result of pressure, there are associated conditions affecting the action of these cells, which vary according to the method used. By one method of pressure the digestive fluid may be weakened, or by another the cells may be separated from the seat of absorption by intervening bodies. Any form of pressure in orthodontia, if continued long enough and hard enough, will produce hyperæmia followed by inflammation and possibly by suppuration or abscess. When hyperæmia occurs we have a serous and a corpuscular exudate which infiltrate the surrounding tissue. Serum being a liquid which in small quantities is taken up by the lymphatics, but when increased, producing œdema, readily comes in contact with the digestive fluid of the osteoclasts which is diluted and resorption retarded. On the other hand, the blood corpuscles of hyperæmia not being liquid insinuate themselves between the cells and the point of absorption and become a mechanical obstruction to their action. In inflammation we have as well as the serous and corpuscular, an additional one, fibrinous, which at first acts mechanically and after liquefaction becomes a menstrum for weakening the digestive fluid. The result of mechanical obstruction to the action of these cells is no better shown than by the resorption of the roots of temporary teeth where the process is stopped by the occurrence of abscess. In this instance the resorptive cells become disseminated among the pus corpuscles, and not being able to act unless in contact, the process ceases. Resorption is more marked when the digestive fluid is undiluted, but when it is disseminated in

the serous exudate of hyperæmia, fibrinous exudate of inflammation, or the pus corpuscles of abscess, it becomes retarded. Herein lies the problem of the efficiency of the different methods—to stimulate retrograde cellular activity without producing excessive hyperæmia or inflammation.

Cognizant of the fact that resorption produced by artificial means or by external agents is not to be compared with nature's physiological process in that we have to deal with two opposites—to stimulate osteoclasts by pressure and at the same time prevent excessive hyperæmia and inflammation, the results of pressure—we may yet by a peculiar method of pressure produce a process approaching very closely nature's own. Such a method of pressure besides being sufficient to stimulate osteoclasts to action will allow, first, regain of tone to the blood vessels and lymphatics in the region of pressure; and second, it will allow free exchange of pabulum and rapid entrance into the lymphatics of the dissolved bone tissue. Of the first condition, I say there will be regain of tone in the vessels, because pressure of any kind tends to paralyze the vaso-motor nerves in that region and hyperæmia will result. Let the pressure be continued and the exudates of hyperæmia will follow, which will retard the action of the osteoclasts in the two ways that have been shown. On the other hand let there be an intermittent pressure, and the room gained by the osteoclasts while under pressure will allow regain of tone to the vessels during that period which some have denominated "rest."

The osteoclast like all other cells has three properties, ingesta, assimilation, and excreta; it also ceases to act when this excreta is not removed. Since the lymphatics under pressure cannot so readily absorb the waste products of the body, and since under continued pressure we have continued stimulation and continued action of osteoclasts, as a result, we have a continued formation of excreta in the most unfavorable conditions for its removal; but let this pressure be such that it will expand to a definite distance

and there remain stationary, then the space gained by active work of the osteoclasts before their action is stopped by the excreta or dissolved lime-salts will allow their escape by the lymphatics which have regained tone. Under continued pressure there is not a free exchange of fluids; mechanical resistance keeps back pabulum, and the osteoclasts become surrounded by their own debris.

Besides the peculiar fitness and adaption of intermittent pressure in the above two fundamental conditions for a physiological performance of resorption, there are other minor qualities which render it still more desirable as a system of pressure to be used in orthodontia. More force may be applied by this method than by the other, and the teeth acting as a lever will under this increased force produce enough pressure, not on the edge alone, but in the body of the alveolus to stimulate osteoclasts in that portion. Were elastic pressure applied even to inflammation, this would not be strong enough to produce resorption at any other point than directly opposite the tooth. I think there is more in this than we are willing to admit. To produce any other resorption than opposite the tooth by elastic force the periodontal membrane would run high in inflammation. This is an easy thing to accomplish with intermittent force since we are able to apply many times the amount of pressure with less danger of inflammation.

It is a *positive* method, and distance gained by its use is definite; it may be measured with mathematical precision; also holds what has been gained.

It needs no renewing; once in place it may be used, as a general thing, until the end is accomplished. As a result the new depositions of osseous materials are not interfered with as they would be when the tooth is drawn back by the fibers of the periodontal membrane during change of apparatus; the death of pulps has been attributed to breaking or changing of appliances.

Under intermittent pressure we have a work almost painlessly performed, because more nearly a physiological

process. According as are all either constructive or retrograde processes physiologically performed are they painless, and as they approach the pathological do they become painful. We have a work more progressive, because of continued action under natural laws,—not an action that is half inflammatory; and a work that is more effective, because produced by causes which work more in harmony with nature, which allows regain of tone, free exchange of pabulum, and more favorable conditions for contact of resorber with resorbed, and an undiluted action of the digestive fluid.—*Ohio Journal of Dental Science.*

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## Editorial, Etc.

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THE FORTY-EIGHTH ANNUAL COMMENCEMENT OF THE BALTIMORE COLLEGE OF DENTAL SURGERY was held at the Lyceum Theater, Baltimore, Md., on Thursday, March 8th, 1888.

The annual oration was delivered by Dr. W. H. Dwinelle, and the valedictory by W. W. Dunbracco, D. D. S.

The number of matriculates was one hundred and fourteen.

The degree of D. D. S., was conferred upon the following graduates by Professor R. B. Winder, dean of the faculty:

D. S. Arnold,	-	-	-	Alabama
R. Blackwell,	-	-	-	Virginia
R. H. Blair,	-	-	-	Texas
E. V. Brookings,	-	-	-	Illinois
C. C. Buck,	-	-	-	Maryland
W. E. Runn,	-	-	-	Georgia
W. D. Cowan,	-	-	-	Canada
J. H. Crossland,	-	-	-	Alabama
J. C. Dana,	-	-	-	New York
M. L. Dawson,	-	-	-	Virginia



W. W. Dunbracco,	-	-	-	Maryland
J. W. Fisher,	-	-	-	Virginia
J. D. Ford, Jr.,	-	-	-	Maryland
W. S. Gregory,	-	-	-	Virginia
S. W. Gregory,	-	-	-	N. Carolina
C. F. Harding,	-	-	-	New York
G. E. Hardy,	-	-	-	Virginia
C. W. F. Holbrook	-	-	-	New Jersey
W. F. Holt	-	-	-	Georgia
T. H. Kellam,	-	-	-	Virginia
A. E. Kellogg,	-	-	-	Pennsylvania
E. C. Kirby,	-	-	-	Maryland
W. R. Knight, Jr.,	-	-	-	New York
L. P. Leonard,	-	-	-	Dakota
A. C. Liverman,	-	-	-	N. Carolina
B. F. Mardis,	-	-	-	Pennsylvania
C. H. McLean,	-	-	-	Illinois
A. Mills,	-	-	-	Canada
R. H. Moloney,	-	-	-	Canada
W. P. Moore,	-	-	-	Virginia
C. G. Myers,	-	-	-	Indiana
H. Muller,	-	-	-	Germany
J. M. Parker,	-	-	-	N. Carolina
G. W. Patten,	-	-	-	Minnesota
W. H. Phillips,	-	-	-	New York
J. Rust,	-	-	-	Virginia
W. H. Savage,	-	-	-	N. Carolina
J. W. Semones,	-	-	-	Virginia
A. W. Seidler,	-	-	-	Maryland
J. W. Smith,	-	-	-	Virginia
M. A. Sparks,	-	-	-	Alabama
G. J. Sproul,	-	-	-	Canada
R. H. Stephenson,	-	-	-	Virginia
S. Szuwalski,	-	-	-	Maryland
H. W. Talley,	-	-	-	Virginia
W. J. Thurmond,	-	-	-	Georgia
J. B. Walton,	-	-	-	D. Columbia
J. E. Ward,	-	-	-	Pennsylvania
F. A. Warnes,	-	-	-	Connecticut

W. D. Williams.	-	-	-	Virginia
L. D. Wilson,	-	-	-	Virginia
J. T. Wright, Jr.,	-	-	-	Virginia
R. E. Wilkinson,	-	-	-	New York

THE SIXTH ANNUAL COMMENCEMENT OF THE DENTAL DEPARTMENT OF THE UNIVERSITY OF MARYLAND was held at the Academy of Music, Baltimore, Md., on Wednesday, March 14th, 1888.

The address to the graduates was delivered by Professor Ferdinand J. S. Gorgas.

The number of matriculates for the session was one hundred and nine.

The degree of D. D. S. was conferred on the following graduates by Hon. S. Teackle Wallis, LL. D., provost of the university.

Benjamin F. Baer,	-	-	-	Pennsylvania
Robert A. Bates,	-	-	-	Virginia
John H. Bean,	-	-	-	Massachusetts
William C. Berry,	-	-	-	Virginia
Thomas C. Blackiston,	-	-	-	W. Virginia
George W. Blakeslee,	-	-	-	New York
Joseph H. Burgess,	-	-	-	S. Carolina
M. O. Burkholder,	-	-	-	Virginia
Theodore A. Cross,	-	-	-	W. Virginia
Samuel S. Daniel,	-	-	-	S. Carolina
L. Wilson Davis,	-	-	-	Maryland
John W. Dean,	-	-	-	W. Virginia
Wm. E. Dieffenderfer, M. D.,	-	-	-	D. Columbia
Manoog D. Dinjian,	-	-	-	Turkey
George T. Feldmeyer,	-	-	-	Maryland
J. Edgar Fitzgerald,	-	-	-	Maryland
Julian Gartrell,	-	-	-	Maryland
Clarence J. Grieves,	-	-	-	Maryland
John M. Hagler,	-	-	-	Virginia
Charles E. Harper,	-	-	-	Virginia
P. Edmond Hines,	-	-	-	N. Carolina
Charles R. Holt,	-	-	-	New York

Charles P. Hubley,	-	-	-	Pennsylvania
Irænus P. Jeter,	-	-	-	S. Carolina
John A. Keepers,	-	-	-	Pennsylvania
Robert E. Lee,	-	-	-	S. Carolina
Sylvester K. Marshall,	-	-	-	Maryland
A. D. McConachie,	-	-	-	Canada
Thos. J. McLauchlin,	-	-	-	S. Carolina
Gerhard W. Muller,	-	-	-	Germany
Geo. F. Nelson, M. D.,	-	-	-	Maryland
Frank H. Page,	-	-	-	Canada
Francis E. Rambo,	-	-	-	Georgia
Stafford Rambo,	-	-	-	Georgia
Robert P. Rawlinson,	-	-	-	S. America
Harry J. Ray,	-	-	-	S. Carolina
Edgar G. Smith,	-	-	-	New York
Edgar L. Smith,	-	-	-	W. Virginia
Howard M. Smith,	-	-	-	Virginia
James P. Smith,	-	-	-	Virginia
Daniel B. Snively,	-	-	-	Pennsylvania
Frank Ryland Steel,	-	-	-	Virginia
A. Zachary Taylor,	-	-	-	N. Carolina
Frederick P. Todd,	-	-	-	Maryland
Joseph J. Vegas,	-	-	-	New York
Willis E. Watts,	-	-	-	New York
Jacob L. Weirich,	-	-	-	Pennsylvania
Fred. M. Wheeler,	-	-	-	New Hampshire
Robert A. Wilbur,	-	-	-	S. Carolina
George L. Wilcox,	-	-	-	New York
Frank M. Willis,	-	-	-	South Carolina

## Monthly Summary

A CHEAP MATRIX.—Recently I have been successful with a matrix which I think will be of value to dentists who do not make gold crowns, and for patients who cannot pay for them, but who are willing to pay a moderate fee for saving

badly decayed and broken molars. It is made from the composition silver strips that come for polishing between the teeth. One of the proper width is selected and cut a little longer than the circumference of the tooth to be treated. It is bent around it with the fingers and the ends punched together with a pair of pliers, drawing it tight. It is then removed and placed on a mandril. My mandril is a round steel 7 in. long, 5-8 in. diameter at the large end, and 1-8 in. at the small end.

The ends of the band are folded over similar to the way a stove-pipe seam is made. If the fold is not strong enough to hold, dip a piece of No. 60 tinfoil in soldering fluid, lay it on the seam, and hold it in the flame of an alcohol lamp. It will be soldered. Adjust the band on the tooth. If it fits, have the patient close his mouth to see that the articulation is all right. Now if the tooth is all prepared fill with amalgam. When full take a wad of cotton and press the filling with it—using your thumb. It will make the filling very compact, and bring the surplus mercury to the surface. Do not remove the band, but instruct the patient to call the next day or week and have it taken off. What I claim for this matrix is, it can be left on the tooth till the filling is hard. It is not expensive or hard to make. It is unequaled in filling large cavities with thin, frail walls by grinding down the walls and building the filling up over the edge, making the whole grinding surface of the tooth amalgam.—*W. Sloan, Peoria, Ill.*

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LEAD OR AMALGAM INSTEAD OF GOLD.—We know that teeth that have in ancient days been filled with lead have been well preserved; and that lead foil was particularly recommended for filling teeth more than sixty years ago. Perhaps it was not for this reason that its use was advocated, but we know that lead and its products are exceedingly sedative in thier influence on sensitive teeth. Tin comes next to it, with the same qualities, at least in degree. We know that amalgam will often be successful where gold would fail. I can recall many cases in my practice where I have filled large molars again and again with gold only to find each time that the dentine would dissolve about the margins of the fillings, and ultimately I would be obliged to remove and refill with amal-

gam; the decay would then be entirely arrested, and the operations have been successful to this day. My theory was that the amalgam threw out a species of oxidation from its surface coming in contact with the fluids of the mouth, so that a sort of galvanic process was set up, which in time resulted in fossilizing the tooth-substance. In some cases where I have left a portion of the soft, partly decomposed dentine in the cavity, years afterward, when I removed the filling, I have found that dentine not only fossilized and recalcified, but became hard and crepitous like glass.—*Dr. Dwinelle, New York.*

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HOW TO CUT A BOTTLE.—A correspondent of the *Chem. and Drug.*, in describing how to make a percolator, mentions the following method of cutting a bottle: I was first shown how to do it by an ingenious mechanic, and have since seen the same published. Put the bottle on a level foundation and fill up with oil (I use linseed oil, being able to use it in paint afterwards) as far as you wish the line of separation to be. Next get a rod of iron as large as possible, but small enough to go into the mouth of the bottle. Make the iron almost white hot and dip it into the oil. In a very short time a crack will be heard when the iron can be taken out, and the bottle will be found as neatly cut as if with a diamond. Should the bottle be very thick, and the crack not heard in a minute or so, a dash of cold water outside will settle the business.

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WATER AT MEALS.—Opinions differ as to the effect of the free ingestion of water at meal times, but the view most generally received is that it dilutes the gastric juice and so retards digestion. Apart from the fact that a moderate delay in the process is by no means a disadvantage, as Sir William Roberts has shown in his explanation of the popularity of tea and coffee, it is more than doubtful whether any such effect is in reality produced. When ingested during meals water may do good by washing out the digested food and by exposing the undigested part more thoroughly to the action of the digestive ferments. Pepsin is a catalytic body, and a given

quantity will work almost indefinitely, provided the peptones are removed as they are formed. The good effects of water, drank freely before meals, has, however, another beneficial result—it washes away the mucus which is secreted by the mucous membrane during intervals of repose, and favors peristalsis of the whole alimentary tract. The membrane thus cleaned is in a much better condition to receive food and convert it into soluble compounds.—*Med. Reg.*

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USES OF CHLORO-PERCHA.—There are many pat uses to which chloro-percha can be put, which I am satisfied the profession do not recognize, to wit: For securing arsenical applications in or on shallow surfaces; for instantly sealing accidental punctures of the rubber dams *in situ*, a small piece of punk dipt in chloro-percha and laid on the defect, for covering plastic fillings under the hardening process, and many other uses which suggest themselves to a bright, practical mind. Glycerin also has many useful qualities for coating cavities and approaches to root-canals which are to be filled with chloro-percha (the latter will not stick on a surface previously covered with glycerin.) For covering all glass stoppers to prevent sticking, for coating (with only a trace) instruments used in working the plastics used on burnishers and stone in place of oil, etc.—*G. A. Bowman, in Dental Review.*

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IRREGULARITIES.—At the last American Dental Association, Dr. W. S. Barrett presented the case of a miss of fourteen, whose anterior teeth projected and were much shortened as if from thumb sucking; which, however, was not the cause, the difficulty in all probability arising from the premature extraction of teeth. There were but two molars in the upper jaw, and the problem was to draw the six anterior teeth back by means of six posterior ones without danger of moving the latter. It was accomplished by carefully banding the bicuspid and molar on each side, as if for gold crowns, and then attaching these bands together by soldering to them a side plate which carried guides and a screw for drawing back a

thin plate or strap, which passed across the faces of the anterior teeth, the whole apparatus being made of gold. The banding of the plate presented so immovable an anchorage that tipping of the teeth was impossible.—*Items of Interest.*

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A PHYSICIAN AND THE TOOTHACHE.—Dr. Peete relates the following incident in the *Archives*: "This man came to me," he said, "with a severe pain in one of his lower jaw teeth, which was somewhat decayed. I told him, *of course*, the nerve of the tooth must be destroyed, the first thing. I took a vial containing, perhaps, an ounce and a half of nitric acid, and ordered the patient to keep perfectly quiet, while I poured a drop of the acid into the cavity.

I had confidence in my steadiness of hand, and knew that I could pour out a single drop without any difficulty. Just as I had the neck of the bottle close enough to the tooth, the man made a sudden movement, and at least an ounce of acid was spilled in his mouth. But I seldom lose presence of mind, and promptly seized a handful of carbonate of potash and crammed it into his mouth. No material damage was done, and the tooth has never ached since."

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THE MOST CONVENIENT MATRIX is one made of copper. Even where the cavity extends under the gums, take a piece of soft copper which you can make very soft by annealing, cut and adapt to your tooth, then remove and solder, either with soft solder or silver solder, then put on your dam and dry your tooth; mix phosphate or use chloroform and gutta-percha on the edge of your band or matrix toward the gums, if you have not the band as tight as you wish, use a wedge between the band and tooth. Dip the wedge in the gutta-percha solution to make it stick. When you have everything dry, you can burnish out your band so as to contour as much as you like. I use copper as patterns for all crowns as it is soft and easily adapted to the root or tooth, then I cut the gold by my pattern and solder it.—*J. S. Marsh, Chicago, in Items of Interest.*











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